SEPTEMBER/OCTOBER 1997

This Old House™

As seen on public television

Tom Silva readies his brush for a fall touch-up.

SPECIAL SECTION

FALL MAINTENANCE GUIDE

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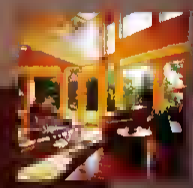

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C O N T E N T S

SEPTEMBER/OCTOBER

Fall Maintenance Guide

The days are cool, falling leaves dance gently in the breeze. Surely autumn is the ideal season for puttering. In this special section, Norm Abram and other This Old House *experts share a harvest of hints about getting a house ready for winter. Learn to stop roof leaks, prep paint, fortify your lawn and fix your furnace.* Page 59

FEATURES

Looking for Trouble 108
Join Norm, Steve Thomas and Tom Silva at the fall dream house project as they poke at beams, thump pipes and pry up floorboards, all in search of hidden horrors they intend to exorcise
By Brad Lemley

Save the Seeds 116
What 8,000 gardeners in 30 countries know about 12,000 rare fruits and vegetables that might grow really well in your garden.
By Jack McClintock

Barn Again 122
When a Vermont barn has come to the end of its useful life, reincarnation as a fancy house on Long Island is not out of the question.
By Nancy Stedman

An American Craftsman 128
Hefting granite boulders as heavy as Volkswagens, stonesmith Jeff Gammelin assembles monumental fireplaces in Maine that re-create the sense of sitting before a prehistoric cave.
By Walt Harrington

Invisible Peril 136
There's a ghost in the garage. You can't see it or smell it or hear it, but you better watch out. Carbon monoxide, the nation's deadliest poison, goes a-creeping into houses all across America each and every day.
By Laurence Roy Stains

Wolf House 142
The mansion author Jack London built in Napa was as rough-hewn and grandiose as its creator. London boasted it would last 1,000 years, but then he also thought he'd live to be 100.
By Stephen Harrigan

The Poster: Architectural Details 149
The enchantment of an old house is in the details. Unfold for the names every builder once knew.
By Craig Kellogg

The Shrubbery Express 151
Indulge your Cornelius Vanderbilt fantasies with a backyard railroad. Hey, it's cheaper than a swimming pool, it doesn't pollute, and your kids will stay home to run it.
By William G. Scheller

COVER PHOTOGRAPH BY KELLER & KELLER

APPRAISE-WORTHY, P. 108

FLOWER CHILDREN, P. 116

BARN MOVER, P. 122

(Continued on page 6)

UP FRONT

Off the Wall

Heavenly TV — 13
When you grab for your Green Acres dream, complete with Amish barn and chestnut grove, just remember that Eva Gabor didn't have a satellite dish
By Jeanne Marie Laskas

Power Tool

How Do You Get That Gleam? — 25
With the magician of the workshop, of course—the homely bench grinder
By Mark Feirer

Technique

Three-Day Bay — 33
It's a challenge to install, but a second-story bay window is a marvel of engineering and can do wonders for cramped dark spaces. It improves the view from outside too.
By Brad Lemley

Hand Tool

Hair on a Handle — 45
The difference between an amateur painter and a professional is often the difference between their brushes
By Peter Jensen

Equipment

In Case of Emergency, Pull Cord — 53
The power is out, the pump is down and the water in the basement is rising. Who you gonna call? No one if you have a standby generator
By Curtis Rist

Fixtures

Splendid Spigots — 88
Does the brave new world of bathroom faucets have something to do with a loss of innocence?

Finances

Mortgage Prison — 93
Which is better, a 30 year loan or a 15 year loan? The answer depends on how long the bull market lasts
By Gary Belsky

Architecture

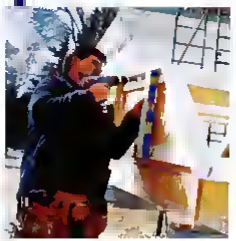
The Forgotten Staircase — 99
Don't assume you can't do something about that unlikable narrow staircase that leads to a dark hallway.
By Dennis Wedlick

FAUCET FANCY, P. 88

(extras)

18 Screw heads
19 Staplers
20 Columns
Car tricks
21 Horror houses
22 Tweezers
Appearances
23 Street trees
Wicket fun

TACK TACTICS, P. 19



BAY BASICS, P. 33

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Plus Contributors 8 Letters 10 A Letter From This Old House 104 Directory 161 TV Listings 160 Save This Old House 202

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SEPTEMBER/OCTOBER

DENNIS WEDLICK (author, "The Forgotten Staircase") spent 14 years in the employ of his mentor, architect Philip Johnson, before opening his own firm in 1993. Since then, he has been recognized for witty twists on tradition in his residential designs. He's also a proponent of small houses; his own upstate New York weekend retreat sits on a modest 20-by-25-foot lot. "There's a misconception," he says, "that rooms have to be enormous to be functional."

ANTHONY COTSIFAS (photographer, "Hair on a Handle"), a specialist in interiors and still life, has shot for Estée Lauder, EMI Records and Martex. Cotsifas divides his time between England and New York, where he shares a studio in Manhattan's meat-packing district with his wife, Patricia, also a photographer, and their dog, Hercules. This is his first assignment for *This Old House*.

GARY BELSKY (author, "Mortgage Prison") is a staff writer at *Money* magazine and a regular contributor to CNN. Finances aren't his only subject. He's written about the world checkers champion and the museum of pinball and video games for *Sports Illustrated*. A New York City apartment dweller, Belsky gained home-building experience during his youth in St. Louis, helping his brother earn money for school.

HELP

LETTERS TO THE EDITOR
Got a problem? We can help. Got a gripe? We're listening. Have a happy experience with a supplier or manufacturer? Share the kudos. Contact us via E-mail at Letters@toh.timeinc.com or write to Letters, *This Old House* magazine, 1185 Avenue of the Americas, New York NY 10036

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I've been collecting locks for more than 20 years and was delighted with your article on Bob Dix ["American Craftsman," March/April 1997], which touched on the rich history and the workmanship in antique locks. There are those of us who think we're in the closet as lock collectors. I can't believe how many people have read the article and called. Thanks for letting me out of the closet.

Jon Kolozvary
Berea, Ohio

I enjoyed Jeanne Marie Laskas's "Blinded by Brackets" [May/June]. As a clerk in an old-fashioned hardware store, I felt glad to know that we are appreciated. Ms. Laskas, however, should understand that our full-service stores are threatened by people like her who buy a "$98 fancy new 12-volt cordless drill" at the superstore in the suburbs, then come to us for the tricky—but low-cost—items. Why not show her appreciation by coming to us for her major purchases?

Rick Steinberg
Lemoi Hardware
Evanston, IL

I found Claudia Glenn Dowling's article on lightning rods very informative ["Zeus on the Loose," May/June]. We get our share of severe thunderstorms, and my only loss until now has been a videocassette recorder that Zeus zapped. I am installing a metal fine liner from the forced-air heating system/hot water heater to the highest point on my roof, and wonder if I will inadvertently create a lightning rod. Since my hot water heater, water lines and electrical system would all be affected, my loss could be substantial.

Gary Baranowski
Roselle Park, NJ

Common sense suggests that houses in areas prone to lightning be protected with an air terminal. But while it is true that a flue of lightweight aluminum or stainless steel will conduct lightning, *This Old House* plumbing and heating expert Richard Trethewey says he has never encountered damage to heating equipment as the direct result of a strike to a vent.

In "Pure and Not So Simple" [May/June], the author left the impression that municipal drinking water is unsafe without a home filtration system. The fact is that municipal systems are subject to the Federal Safe Drinking Water Act as well as state and municipal regulations designed to protect consumers. Home water-treatment devices, on the other hand, are not tested or regulated by the federal government and, if not maintained properly, can actually cause water-quality problems. No public water supply is sterile; most people don't require sterile water. Persons with special health concerns should consult with their doctor about extra precautions.

John Gregoire
Massachusetts Water Resources Authority
Boston, MA

We would like to install the flexible tubing used to plumb the Tucson project ["Team Tucson," May/June] in our home in northern Montana. Can it be used in cold climates, and where do we get it?

Maren and Dave Arnotte
via E-mail

According to the manufacturer, the Aquapex System has been extensively tested in cold climates and performs well. Already common for radiant heating applications, cross-linked polyethylene tubing has only recently been used in this country for potable water. Installers must be trained to work with flexible pipe. A special tool expands the end of the tubing, which then shrinks around a brass fitting. For more information, call Wirsbo Co. at 800-321-4739.

Your article on the construction of an adobe home ["Adobe: the Magic Mud," March/April] states: "The more slowly cement dries, the stronger it is." Cement does not dry, it cures. When combined with water, cement hydrates into an interlocking maze of crystalline fingers that gives it strength. Because the water is chemically linked in the matrix, little evaporates. This chemical reaction will proceed as long as cement has water to react with. In fact, a cured cement-water mixture may be weakened if it is "dried"—heated to the point that water is driven back out of the molecular structure.

Daniel Grant
Grand Parry, TX

The sheet linoleum flooring in my bathroom has begun to curl where it meets the built-in bathtub. Apparently, water dripping down the tub has penetrated the caulk joint. My plan is to use a white quarter-round molding made of plastic (rather than wood) to remedy the situation. Will this work, and if so, can you tell me who manufactures the molding?

Ray Johnston
Nacogdoches, TX

Plastic molding may indeed be part of a rot-proof solution to your flooring problem. First, make sure the floor is dry, then spend a few minutes racking down the peeling vinyl with short flooring nails all along the intersection. Protect your rub from hammer marks with a piece of cardboard taped into place. Installing quarter-round molding on a bead of silicone will cover the nails. Expect to spend about $13 for eight feet of molding. (Available from Fypon, 800-537-5349.)

punch list

definition: a list of items incorrectly done or remaining to be finished on a construction job

- In the July/August story on the Milton Dream House ["A New England Wonder"], director Russ Morash incorrectly recalled the purchase price of an early *This Old House* project in Dorchester, Massachusetts. It was $17,000.
- In the July/August Directory, the telephone number for Seiman Tools, manufacturer of the tubular steel workhorse shown on page 46, was incorrect. The correct number is 888-585-3924.
- Anyone in search of the Agri-Fab push mower we tested in the May/June issue ["The Reel Story"] can find buying information on page 145 of that issue's Directory. Agri-Fab manufactures the mower for Smith & Hawken and several other suppliers. To locate one in your area, call AgriFab at 217-728-8388.

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OFF THE WALL

BY JOANNE MARIE LASKAS

Heavenly TV

One day recently a satellite dish came into my future. I was in the mall, passing a kiosk featuring those new baby dishes, 18 inches in diameter, mysterious gizmos capable of beaming something like five hundred million thousand TV stations straight from outer space into your living room.

Jim, the satellite dish salesperson, said I could install a dish like this myself, no problem. "I put my mom's up in, like, a half an hour," he said. He showed me how to hook the dish to the dual receivers and how the remote worked off a special UHF antenna so you could change channels without even being in the same room as the TV. He showed me the on-screen channel guide, and he demonstrated the superb picture quality, thanks to 120 watts of digitally compressed signal.

I nodded and nodded some more, never mentioning the nagging voice inside my head. Six hundred bucks for the privilege of watching a whole lot of stupid television? Was this really in line with my values? Did I really want to be a person who had access to five hundred million thousand TV channels? *(Text continued on page 16)*

ILLUSTRATION BY MARTIN MAYO

HOW MARVIN HAMLISCH LOOKS AT THE WORLD

If music is the universal language, few people are more eloquent than Marvin Hamlisch. His award-winning melodies and musical scores include "The Way We Were," and "A Chorus Line." Yet few things in life give him more pleasure than a victory by his beloved Yankees and the view from his recently-remodeled vacation home. By removing three small windows and replacing them with six sliding french doors, Marvin created his favorite place to recharge his creative spirit.

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(Continued from page 13) Well, yes. But it's not something I would brag about.

I handed Jim my Visa card, and soon it was a done deal. I became a person with a satellite dish.

I took my satellite dish home. "What will the neighbors think?" I said to Alex, the boyfriend, who had volunteered to head the installation project. We were sitting on the roof. He had the instruction manual between his teeth.

"Hee hon ha hav heehor," he said.

"Huh?"

He spit out the instruction manual. "We don't have any neighbors."

Good point. We had recently become country people, having escaped the city and moved to a farm in the middle of nowhere, Pennsylvania (where, I should point out, you can't get cable). It was a dream come true. Fifty rolling acres, a bank barn built in 1887 by Amish dairy farmers, a lily pond with a visiting blue heron, a stream meandering beneath a towering chestnut grove.

And now, a satellite dish. Hmm. Did this *go*? I mean, Eva Gabor on *Green Acres* didn't have access to TV, at least not that I can remember. And don't you just hate it when you're driving through some lovely rural area, and you're drinking up the pastoral landscape, imagining all the country folk in their houses churning butter or weaving rag rugs or canning peaches—and then you see a giant satellite dish sitting in the yard? "You mean they're not pressing flowers or weaving rag rugs or whittling corncob pipes?" you think to yourself. "You mean they're in there... *watching TV*?

Well, yes. Speaking as a country person, I can say yes, sometimes we are. Only up till now I've been fiddling with this darn antenna, and I can hardly get two stations to come in clearly.

Not that I've had nothing better to do, out here in the middle of nowhere. In fact, I took to country life almost immediately. I loved the whole *Mayberry RFD*-ish atmosphere of the nearby town. I loved the *Petticoat Junction*-esque feel of the local water tower.

And now, a satellite dish. Was this going to disrupt the bucolic image of our home? Throughout their brief history, home satellite dishes have suffered a rather serious image problem. Up until a few years ago, the only kind you could get were those giant ones that took up entire front yards and were right up there with abandoned refrigerators and '72 Chevys on cinder blocks for lawn ornamentation design. They were like billboards announcing a homeowner's priorities: "Hello, I am a person who watches a hell of a lot of TV."

"And I am not that person," I said to Alex.

"Right," he said.

But that, of course, is the beauty of these new little satellite dishes. They allow the homeowner to be more private about his or her television watching proclivities. Now you can be a major couch potato flipping aimlessly though 500 million thousand channels, and nobody driving by your place has to know.

Not that I would ever become such a person.

"Right," Alex said, and then he asked me if perhaps I knew all the words to the *Gilligan's Island* theme song.

I sang it. (I thought it was a test.)

"My point exactly," he said.

Whatever. One thing was certain. It was taking us longer to install our satellite dish than it took Jim to install his mother's Lake, four hours longer. And about half those hours were spent screaming at each other. Alex was on the roof aiming the dish at the southern sky, while I was inside at the TV watching a little bar go up and down, indicating signal strength.

"We got sixty percent!" I yelled. "Whoa, now it's forty. Oh, God, you're losing it! YOU ARE LOSING IT!"

"WHAT?!"

"YOU HAD IT, BUT NOW YOU LOST IT! Hold on! Okay, you are at EIGHTY PERCENT! DON'T MOVE!"

I ran outside, climbed the ladder. "Don't move an inch!" We were finally aimed directly at the satellite and now all we had to do was put in the final bolt, a specially designed cylinder that would hold the entire four-and-a-half-hour project together.

Alex was balanced on his left knee, reaching for the bolt, which I was about to hand to him but then I dropped it. It went tinkle, tinkle, rolling down the roof. We watched it land, plop, in a pile of oak leaves.

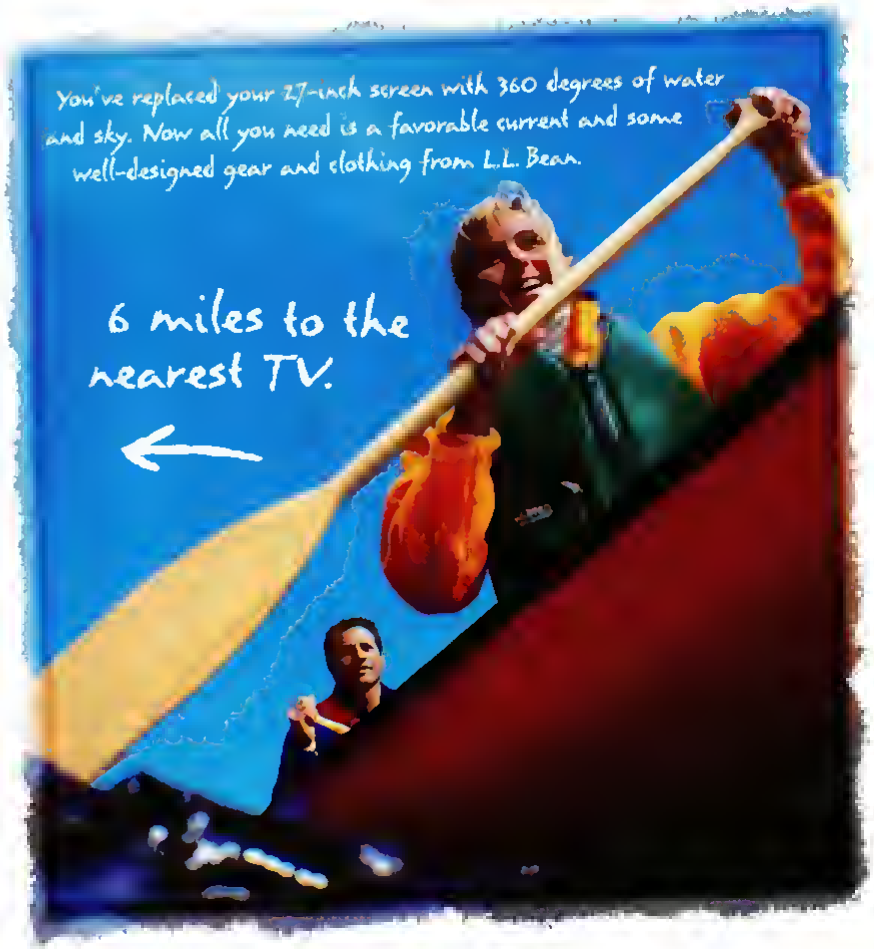
"Sorry about that, Chief," I said, feeling myself in a total Maxwell Smart moment. He looked at me. He was sweating. He seemed annoyed. I felt bad. I said let's just forget the whole thing—which I didn't mean. The closer we got to completing this installation, the more I noticed myself salivating for TV.

We searched for the bolt while I sang the *Beverly Hillbillies* theme song, and in those moments I understood something about myself. TV deprivation. I had a bad case of it, thanks to this country living. Hey, I grew up in the '70s. TV is my lifeline. And what's the matter with that? TV makes me feel connected. To my youth. To the civilized world. And now, thanks to my new satellite dish, to the stars.

That was the thing that hit me when we finally found the bolt, got the thing together, climbed off the roof and called the 800 number that brought TV, glorious TV, into the living room. I'd never really considered TV a cosmic experience before. I mean, what was cable? A wire hooked to another wire hooked to a cable company. There was no mystery in cable. But now, a satellite. More than 22,300 miles up, moving at the exact same speed the Earth moves. And I had a path to it, through the sky, piercing the atmosphere, invisible.

I took the remote. I got out a bag of Doritos and a blanket and had a really nice visit with Steve and Norm. ■

What was cable? A wire hooked to another wire hooked to a cable company. There was no mystery in cable.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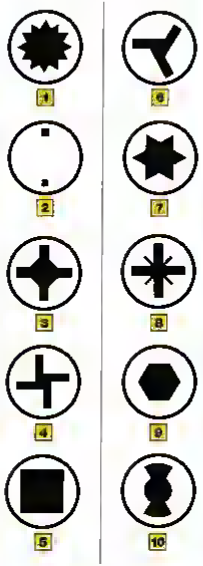
Lot o' Luck

In 1921, when Wales's Gwydir Castle was stripped for auction, William Randolph Hearst bought Lot 88—the great Jacobean dining room's paneling, ornamental door, chimney piece and frieze. Fifteen crates intended for Hearst's California wonderland, San Simeon, were stored without ever being opened. In 1956, a Hearst heir donated them to New York's Metropolitan Museum of Art. The 13th century castle, meanwhile, sat neglected until 1995, when two Britons, architectural historian Peter Welford and his wife, Judy Corbett, a bookbinder, bought it. The castle had recently been the site of drunken rave parties and, ironically, it was one of the revelers who suggested the couple inquire about the lost Gwydir artifacts stored at the Met. "We wrote, hoping they had something," Corbett says. The existence of Lot 88 stunned them, and, after some artful negotiations, the Met repatriated the decorative relics for a fee. In hindsight, Hearst's insatiable acquisitiveness may have been for the best. In 1922, one year after the publishing mogul carted away the treasures, a fire raged through the castle's dining room, turning what little was left to ashes.

Peter Welford and Judy Corbett's Welsh castle dining room has returned after a 75-year American sojourn

Turning Heads

Screw heads once had simple slots, and almost any screwdriver in a toolbox could turn them. Now, when a neighbor comes abarrowing, you have to interrogate him about which screws he's using: Phillips? Torx? T-Star? It's enough to make you long for nails. Still, as long as there are engineers, there will be more than one way to sink a screw. Test your knowledge of nomenclature by matching names to heads. Then you can really impress the neighbors.



A. T-STAR
B. RORERTSON
C. TRIPLE Y
D. RUTTERFLY
E. TWELVE-POINT
F. ALLEN
G. QUADREX
R. OCTO-DRIVE
I. T-CROSS
J. SPANNER SECURITY

Tackers

Staple guns look like amateur tools," Tom Silveseys, "but pros use them a lot." And although the act of stapling is relatively simple, a few caveats apply. Avoid overkill—tacking up a garage-sale poster with ¾-inch staples (the longest) will exhaust you. For screening or fabric, a gun with a toothed fitting up front to tension the meterial is best. Electric guns have trigger locks—use them. And always remember your make and model number when buying staples, because one size does not fit all. Stapling may seem hasty and temporary, but "people who do real work for a living learn pretty quick to find the easy way," Tom says. "Don't write off staple guns until you've tiled a ceiling with hammer and nails—then had a long talk with your fingertips and neck."

The pros go for hammer tackers which are made for rough service and have double magazine capacity for less reloading time. This modern billy-club design is better balanced and nimbler than older front-weighted models

This switch-hitter fires regular and round crown staples. A cable template on the nose saves you from accidentally damaging wire insulation

An electric model can handle brads for molding, and its canted head and light trim body are good for tacking in tight spots. A magazine port shows the staples remaining

Although going cordless means adding a heavy battery, this model holds even the longest standard staples (⅞") and can shoot up to 700 between rechargings

extras

WEB

This month's sites expose the hidden world of plumbing—without a crowbar or a wrench

www.plumbnet.com

Check Plumbnet's interactive plumbing network for expert advice, new products, industry trends and chat (Hint for the "mature" bath room: "Rebuild your toilet if at all possible.") Links connect with drinking water regulations, the three part history of London's sewers and other tales—just avoid the dreary World Plumbing Council home page

www.toilletology.com

Kay Keating bills her Toilet ology 101 as "a complete course in toilet training." A Maryland based how to educator, Keating teaches 33 lessons about throne anatomy, basic repairs and water conservation. She recommends "preventive plumbing" but addresses catastrophes as well—making the site (like good plumbing) essential for emergencies.

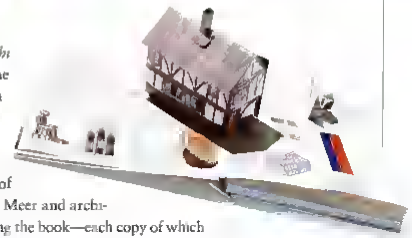
Column As You See Them

The ancient Greeks based the classical orders (Doric, Ionic, Corinthian) on human proportion, and some academics contend that people subliminally prefer columns that most closely match how they look in a mirror. Now Yale architecture professor Patrick Pinnell has made his own "small contribution" to the discussion. He says preferences might be more related to a three-dimensional correspondence. Having tried out his hypothesis on a number of friends, no doubt making him the hit of the Bulldog party circuit, Pinnell recently felt emboldened to test his theory on *This Old House* hosts Steve Thomas and Norm Abram. Assuming that cameras may lie but hosts do not, Pinnell plugged the guys' height and weight into an equation that computes volume. Keeping their heights constant, he reduced their bodies to giant cylinders, as if they'd been liquefied. The resulting proportions, Pinnell says, suggest that Steve would favor the Tuscan style of column and Norm the Doric. Indeed, Steve confirms that he does prefer "the more simple columns." But, it turns out, so does Norm.

BOOK

IN YOUR FACE

In just 14 pages, *The Architecture Pack* traverses the history of building design from Imhotep, the ancient Egyptian whose Saqqara funerary district earned him deity status, to Richard Meier and his Getty center in-progress. What the book lacks in depth, however, it makes up in depth perception. The pages literally unfurl, bursting with colorful pop ups, pullouts, foldouts, overlays, things with strings and even a do-it-yourself paper model of Gerrit Rietveld's Modernist Schroeder House. "Paper engineer" Ron van der Meer and architecture historian Deyen Sudjic spent two years designing the book—each copy of which is handmade in China—recreating in 3-D such masterpieces as Chartres Cathedral, the Sydney Opera House and a Palladian villa. You may buy it for the kids, but they'll be lucky to wrest it away from you.



"All architecture proposes an effect on the human mind, not merely a service to the human frame."
—John Ruskin

Houses That Go Bump in the Night

Think your house has problems? At least they're restricted to this time-space axis. For some perspective, this Halloween check out one of these movies, recommended by *Entertainment Weekly* video reviewer Ty Burr.

MOVIE	WHAT THE HOUSE INSPECTOR WOULD SAY
The Haunting (1963) Four psychics try to cleanse massive Gothic "house that was born bad."	Lead poundings on walls have resulted in deep structural fractures
The Ghost and Mr. Chicken (1966) Intrepid reporter Don Knotts spends night in local spook joint	Blood not removable from organ keys; replacement instrument recommended
The Legend of Hell House (1973) Three ghost-chasers try to rid mansion of DeSade like owner's spirit	Giant stone crucifix irreparably damaged while crushing a character, mummified corpse in hidden room needs minor restoration
The Amityville Horror (1979) All American family battles nasty dead Satanist	Exterminators still working on bedroom fly problem, pool of demonic ichor in basement needs draining
House (1986) Horror writer confronts ghosts in dead aunt's home	Rebuilding of closet space necessary to remove winged skeletons, Vietnamese rain forest and George Wendt.

Gut Course

With its leaky roof and black spray-painted rooms, a 105 year-old carriage house in Springfield, Massachusetts, had aged into a most undignified eyesore. But the 3,500 square foot building in the city's huge Forest Park had a higher calling: as a special-events venue. In came a team of high school students, who adopted the building for one of the most ambitious shop-class projects ever. Working for five years, budding carpenters and electricians from Putnam Vocational Technical High School laid hardwood over the dirt floor, reproduced Victorian trim and installed modern heating and wiring in a second floor caretaker's apartment—for less than half of the $1.5 million cost experts predicted.

SAN FRANCISCO BY JASON SCHULTZ • ILLUSTRATION BY JOE CIARIELLO. BOOK BY BARRAN HASNAS. BARGAINS HOUSE BY KELLEY & KELLER

SILLY CAR TRICKS *The first step to home improvement is getting out of the parking lot*

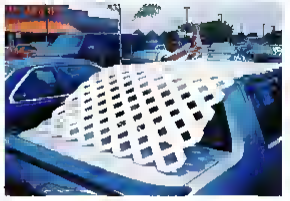
The classic bumper-to-bumper routine

The 2x4-tie-down system

The let it all hang out approach

The taken from ride technique

The stacking stuffer school


The please lattice go method

extras

EVENTS & APPEARANCES

STEVE THOMAS
- Sept. 14—Artisans Crafts Fair, Codman House, Lincoln, MA, 617-259 8843
- Oct. 4-5—Jacksonville Home and Patio Show, The Prime Osborn Convention Center, Jacksonville, FL, 904-730 3356
- Oct. 18—Paint and Decorating Contractors of America Show, Ramada Rolling Green Hotel, Andover, MA, 888-732 2632

NORM ABRAM
- Sept. 6—Blain's Farm and Fleet Store, Oak Creek, WI, 414-764-6606
- Sept. 20—True Value Hardware, Hartville, OH, 330-877 3631

TOM SILVA
- Sept. 6—Fall House and Garden Show, Austin Convention Center, Austin, TX, 210 980-4078

RICHARD TRETNEWEY
- Oct. 11-12—Southern Ideal Home Show, Charlotte Merchandise Mart, Charlotte, NC, 704 333 7709

I've Got Yew Under My Skin

A house is just a collection of splinters waiting to meet your tender flesh. Small splinters tend to rise in the skin over time—often making them easier to pull the next day—but gnarly ones like glass (brittle and hard to see), metal (goes in deep and hides) and rot-resistant woods like redwood and pressure-treated pine (the chemicals inflame skin) require a steady hand and the proper pointy tool. Cosmetic tweezers with flat tips are much too clunky for most splinter duty. Wedge- or needle-tip tweezers are more precise, and the best are stainless steel with tips ground to meet exactly. To use: Clean the impaled area with soap and water, dip the tweezers in isopropyl alcohol to sterilize them, grip the shard and back it out gently. An antiseptic will thwart infection, but if dirt is involved, tetanus is a threat, so pay a visit to your doctor.

An extra long grip and ultra sharp points grab embedded splinters with minimal tearing of sensitive skin.

A flexible magnifying glass attached to bevel tip tweezers improves the view of a splinterectomy.

German made stainless steel tweezers are needle-sharp and ergonomically designed.

A compact design affords greater control in maneuvering the precision-ground tips.

RATTENBURY HOUSE BY WAYNE BURDSALL/FIE MARIANNE THEEGERA; THICKETS AND APPLIES BY DEANN HARRIS; ROSES BY KEN ONION; TREE SHARP BY TIM CARMELL

A House With a Plan

You've found the perfect house: an intelligent layout, spacious yet intimate rooms, clerestories for natural light, French doors, bay windows and a big rugged hearth in the living room. And why shouldn't it be great—Frank Lloyd Wright protege John Rattenbury of Taliesin architects designed it for *Life* magazine, which published a story on it this year. The three-bedroom, two-bathroom, 2,100-square-foot house costs an estimated $180,888 to build in most places, excluding land and site development, and can be adapted to changing family needs. You can also choose from among six exterior treatments depending on your budget and where in the country you live. The best part is that while you might expect to pay an architect upward of six figures for such a plan, you can get a detailed blueprint of this house for only $495. He'd never have admitted it, but Wright couldn't have done better himself.

GARDEN

Wicket Good Fun

Once the grass is finally greener on your side of the fence, it's time to invest in some garden architecture. Landscape designer Brian Foster, the Palladio of knee-high Doric columns, offers these croquet wickets, which turn the game into even more of an aesthetic pursuit. His plastic porticoes, pergolas and porches stand up to the elements as well as to hard-driven wrecking balls. Best of all, a cluster of Foster's follies in the distance transforms ordinary backyard grass into the lawn of an English lord.

> *Without the plumber there would have been no nineteenth century.*
>
> —Adolf Loos

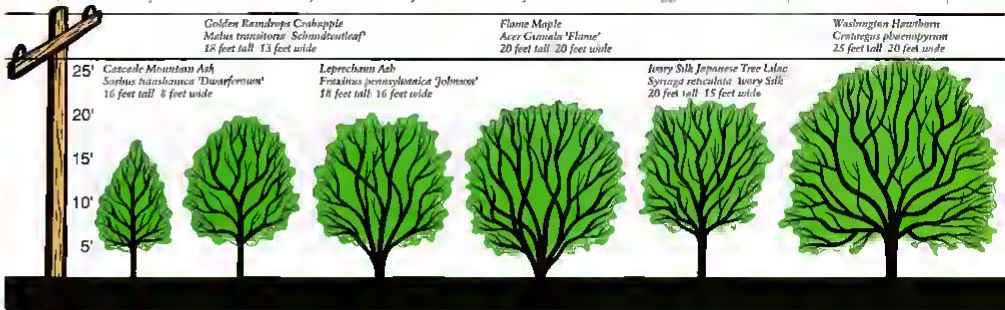
The Roses That Bloom in the Fall

Many gardeners equate roses with June, but why stop then? At the nation's oldest city-owned rose garden, Elizabeth Park in Hartford, Connecticut, a turn-of-the-century climber called New Dawn is often covered with blooms in September. And at the New York Botanical Garden, many modern hybrids, including the David Austin English rose "Evelyn," are fall standouts. Rosarians there clip off all blossoms and halt fertilizer at the beginning of August. Six to seven weeks later, voilà! With just warm enough fall weather, these second-season roses can last through early October, sometimes even later.

A New Dawn in autumn

Green Between the Sidewalk and the Pavement

Nothing beautifies a neighborhood more than rows of trees flanking a street. But picking varieties suited to the narrow strip between sidewalk and pavement is tricky. Roots must survive with little irrigation or space—but not buckle concrete. Trunks must stand up to dogs and bicycles. Branches must fan out above heads yet end below phone wires. Most of all, there must be year-round beauty. Here are several suggestions.



Taste before planting

Belle de Boskoop, Hubbardston Nonsuch, Newtown Pippin, Winter Banana—deciding among the hundreds of apple varieties for your backyard is difficult enough. But committing to one and having to wait five years for the tree to bear fruit before you know how the apples taste can be torture. Jill and Tom Verbeck at Applesource remove the mystery, offering mail-order sample packs so you can decide whether you like the slightly tart Braeburn and sweet Fuji (Tom's favorites) better than some 90 other varieties Applesource grows.

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BY MARK FEIRER

This hefty hinge, a price from a Wall Street renovation, lost paint and gained shine after a 10-minute buff by a bench grinder.

HOW DO YOU GET THAT GLEAM?

Bench grinders make magic on metal

The landscape of a machine shop is an alien world, with mountainous gray machines looming above a littered plain of razor-sharp slivers and gleaming curls of spent metal. At the periphery of this stygian scene, off in one corner, is an island of mechanical simplicity: a bench grinder. A one speed, one horse motor bolted to a table, it's a squat metal toad of a tool with two wheels sprouting ear-like from either side, ready to work miracles on metal.

With a steady hum and a halting, hissing scrape, a grinder can sharpen a chisel or touch up a mower blade or, in a spray of sparks, scour rough welds smooth. Fitted with a wire wheel, it can chew decades of paint off old door hardware or claw through rust on a shovel. With a flannel-soft buffing wheel, it can polish silver to a mirror shine, restore the gloss to a '49 Harley or make pewter candlesticks glow like a winter sunrise.

Russ Morash, executive producer of *This Old House*, regularly grinds fresh edges on his garden spade with an

PHOTOGRAPHS BY MICHAEL GRIMM

ancient bench top tool. "That's the secret to getting the most out of a spade," he confides. Tom Silva keeps a bench grinder in his truck and lugs it out to sharpen cold chisels, fix worn screwdrivers, fabricate molding cutters, shorten bolts and sharpen drill bits. Norm Abram uses his to put a hollow-ground edge on woodworking chisels.

Some woodworkers, however, don't quite trust bench grinders, citing their tendency to damage fine steel. But that's like boring into concrete and blaming the drill for messing up a good spade bit. With the right wheel, the right speed and a touch of finesse, a grinder is capable of surprisingly fine work.

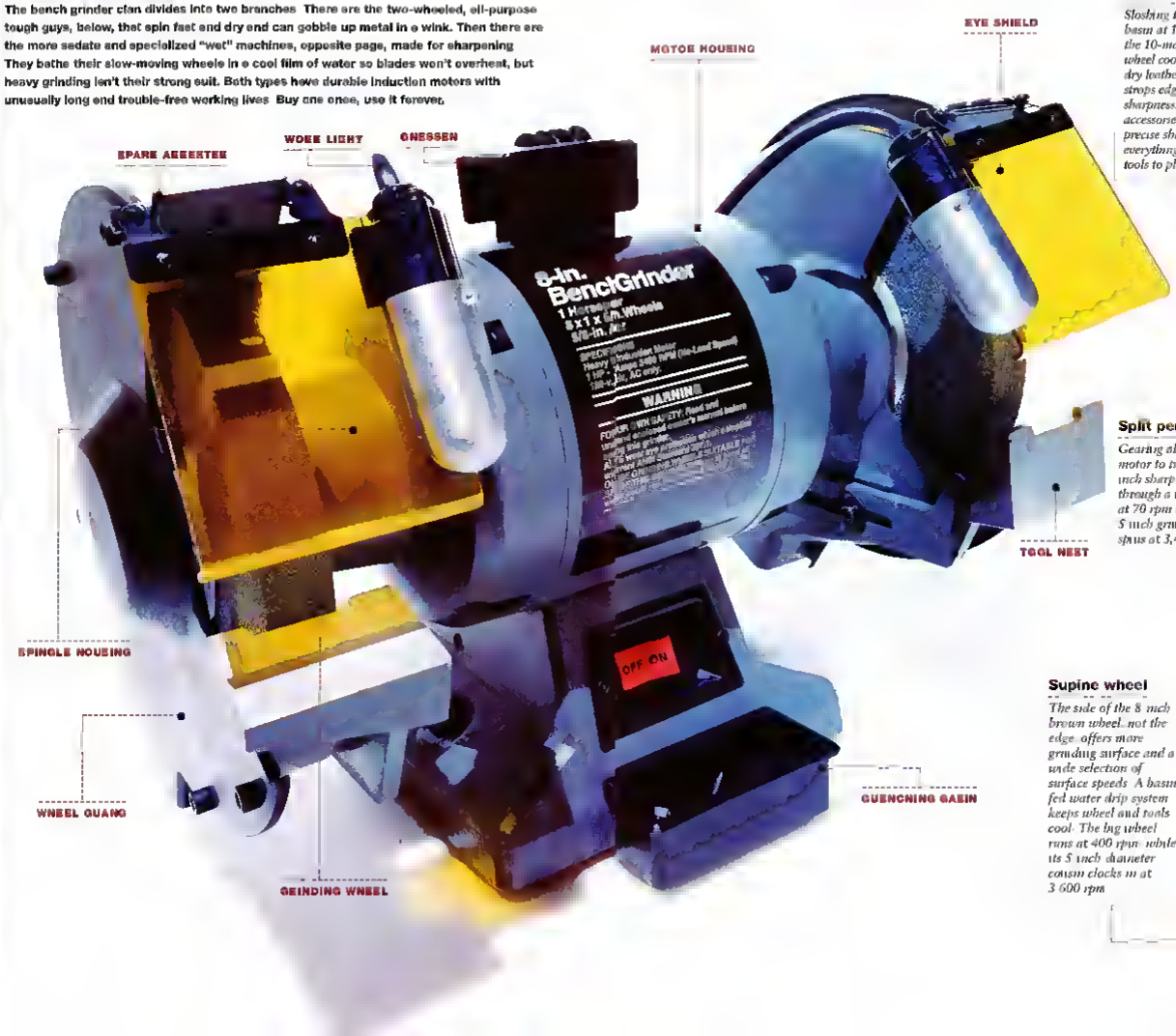
Part of the grinder's bad-boy reputation stems from its gray aluminum-oxide wheels. A wheel's blocky granules wear down slowly, making it great for hogging off metal quickly but not so good for sharpening, even in the finest grits. "Grind off too much too fast with the wrong wheel," Tom warns, "and you'll ruin the steel's temper by overheating it." When steel turns blue, the temper is gone, along with any ability to hold an edge. The damage must be ground away—carefully—to expose new metal. Dipping a tool in water is one way to keep it cool, and many grinders include a quenching cup for this purpose. Far better for edge tools are white aluminum-oxide wheels. They wear faster and cut slower, but their angular grains shear through steel for a finer finish with less heat.

As important as using the right wheel is using the right speed. Unlike the universal motors found in portable power tools, grinder motors are driven by induction, a propulsion method suited to gritty shop environments. Induction motors are sealed within their metal housings; have no brushes to wear out, no air vents to clog, few moving parts and can spin relentlessly at peak horsepower without overheating. If a grinder runs when first plugged in, it'll probably run forever. "Dad bought the one we have when he was in the business," says Tom, and Russ's is a geezer too.

The induction motor's big drawback is its single-minded inability to turn at more than one speed. There are high-speed grinders that spin their wheels at 3,450 rpm—perfect for grinding and buffing—and there are low-speed grinders that hum along at a sedate 1,725 rpms—good for sharpening. The only way to have two speeds is to buy two grinders, or get a hybrid, geared-down system with wetted sharpening. *(Text continued on page 30)*

ALL IN THE FAMILY

The bench grinder clan divides into two branches. There are the two-wheeled, all-purpose tough guys, below, that spin fast and dry and can gobble up metal in a wink. Then there are the more sedate and specialized "wet" machines, opposite page, made for sharpening. They bathe their slow-moving wheels in a cool film of water so blades won't overheat, but heavy grinding isn't their strong suit. Both types have durable induction motors with unusually long and trouble-free working lives. Buy one once, use it forever.

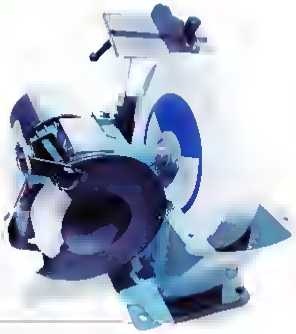


Slow stone

Sloshing through a water basin at 100 rpm keeps the 10-inch grinding wheel cool and clean. Its dry leather companion strops edges to razor sharpness. A host of accessories permit precise sharpening of everything from lathe tools to plane irons.

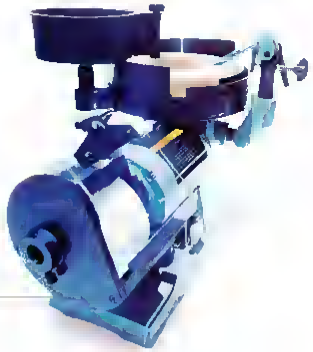
Split personality

Gearing allows the same motor to turn the 10-inch sharpening wheel through a water trough at 70 rpm while the 8-inch grinding wheel spins at 3,450 rpm.



Supine wheel

The side of the 8-inch brown wheel, not the edge, offers more grinding surface and a wide selection of surface speeds. A basin fed water drip system keeps wheel and tools cool. The big wheel runs at 400 rpm; while its 5-inch diameter cousin clocks in at 3,600 rpm.



BUFF AND GRIND

Sharpening

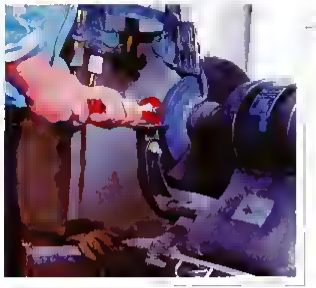
When grinding an edge, use the tool rest for support. Sharpening is easier to control and more efficient when the wheel's top spins toward the tool's edge. Here a gloved hand puts a hatchet to the rest as the metal pivots in a sweeping arc over the wheel. This grinder's spark arrester should be closer to the wheel, an eighth-inch clearance is best.

Brushing

With its hundreds of scratchy steel fingers, a wire wheel rids this old shovel (soon to gain a new handle) of rusty scale and caked dirt. A good grip is crucial, and, as in buffing, the object of the wheel's attention should always touch the wheel below the spindle. Tool rests are tempting, but using one invites a violent jam-up. Safest when used with a guard.

Buffing

A spinning flannel wheel dosed with buffing compound can get metal so hot the surface momentarily liquefies. Wear gloves, keep the metal moving and always keep the work lower than the spindle, or the wheel will yank whatever you're buffing out of your hands. For best results, use separate wheels for each compound so you don't scratch what you mean to polish.



Dressing takes it off

In the battle between grit and steel, a new wheel's crisp, flat rim gradually gets dished and becomes glazed—clogged with metal and spent abrasive. Dressing restores true flatness. This all-steel star-wheel model, common in machine shops, nibbles the wheel flat. Other dressers have diamond tips or blocks of silicone carbide.

Buffing buddies

The abrasives embedded in these pastel-like sticks do the buffing work: 1. JEWELER'S ROUGE: *fine, brings out the luster of gold, silver or surfaces buffed with other compounds. 2.* TRIPOLI: *general-purpose, removes minor imperfections, shines brass, aluminum, pewter. 3.* EMERY: *aggressive, for coarse buffing and rust removal. 4.* PLASTIC: *buffs out scratched acrylic. 5.* WHITE ROUGE: *brightens stainless, chrome and nickel. 6.* STAINLESS: *similar to white rouge.*

There are two ways to remember a measurement.

Only one works—the new Repeater 25 from Zircon, the maker of StudSensor™. Why struggle to memorize all those measurements when you can record them? Zircons Repeater 25 is a rugged 25 foot, professional tape measure that also allows you to record up to 20 seconds of measurements and play them back in sequence. You'll never have to scramble around for a pencil and a piece of plywood again. Remember measurements the right way with Repeater 25.

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WHITE ALUMINUM OXIDE
Cuts smoothly but wears faster than grey wheels
FELT BUFFING
Solid wool wheel favored by jewelers, also used to polish glass
BUFFING
Pleated, flexible flaps for light buffing
FIBROUS NYLON
Aluminum oxide impregnated. Removes burrs and minor imperfections
NYLON BRISTLES
Impregnated with abrasive, won't rust

(Continued from page 26) wheels. The low speed bench grinder, by the way, is virtually indistinguishable from its reckless cousin, except for its higher price (about $200, compared with $60 or so for the high speed version).

That's not the whole speed story, however. Because a wheel moves faster at its rim than at its center, bigger wheels have higher rim speeds. (To figure a wheel's approximate rim speed or "surface feet per minute," divide its diameter by four and multiply that by the motor's rpm.) An eight-inch wheel on a high speed grinder, for example, has a rim speed of 6,900 feet per minute, a third faster than a six-inch wheel. The formula explains why wheels become less efficient as they wear down.

In addition to their speed limitations, most bench grinders share another common failing, flimsy tool rests. The poorly designed rests on many grinders flex and wiggle and have limited ability to adjust to the ever shrinking wheel, they're an inconvenience as well as a safety hazard. Add-on tool rests that bolt to the bench offer a wider range of adjustment. Then no matter how small a wheel gets, the rest's edge can always be within an eighth of an inch of the wheel, with the spark guard hovering just above. Good aftermarket rests are also stiffer, bigger and easier to adjust than the wimpy shelves on most grinders.

Properly equipped and safely used, the simple unassuming bench grinder is the sorcerer of the shop, giving new life to old metal. When touched by its wheels, a dull blade cuts, a rusty hinge swings, a tarnished doorknob gleams. In its warm, reassuring thrum, there is the hint of rebirth. ●

Spinning wheels

Getting the best from a bench grinder is a matter of matching wheel to work and grinder to wheel. First, make sure the wheel's holes match the grinder's spindle, which comes in ½-, ⅝- and ¾-inch diameters. Second, check the wheel's speed limit; too many rpms can tear it apart. Third, before mounting any grinding wheel, new or old, test it for cracks. Hold the wheel on a finger and tap it with the handle of a screwdriver. Good wheels ring, bad wheels thud and might explode while turning.

FOR SOURCES, SEE DIRECTORY—PAGE 191

Unique base is designed to mount on 2x4's to further extend your work surface.
Extra-tall sliding fence lets you position crown moulding upright for easier cutting. Huge table combined with removable table extension and sliding fence adds up to the largest work surface of any 12" miter saw.
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The Delta 12" Compound Miter Saw provides extra, extra large capacity. Crosscut up to a 2x8 or miter up to a 4x6 in hard or soft woods. Big, beefy 15 amp motor cuts big jobs down to size.
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Work clamp holds stock securely for improved safety and precision.
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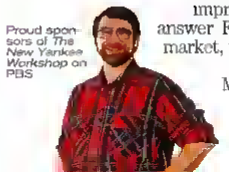

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TOOL TALES

[LEATHERMAN® TOOLS AND THE PEOPLE WHO USE THEM]

№ 6

We had two choices: crash in Dillingham or head back to Anchorage and crash there.

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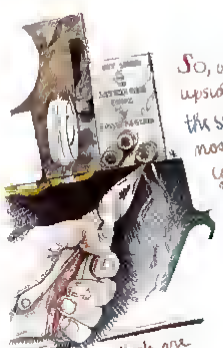
So, I rolled my co-pilot over, I got out my LEATHERMAN Tool. I was upside down as I pried open the instrument panel with the screwdriver. Then, using the needle nose pliers, I fished out a broken cable. I kept pulling and with a "CLUNK, CLUNK, CLUNK" the landing gear descended and locked.

We landed safely in Dillingham. I gave my Leatherman Tool the next day off.

Mike Hardin,
Dillingham, Alaska.



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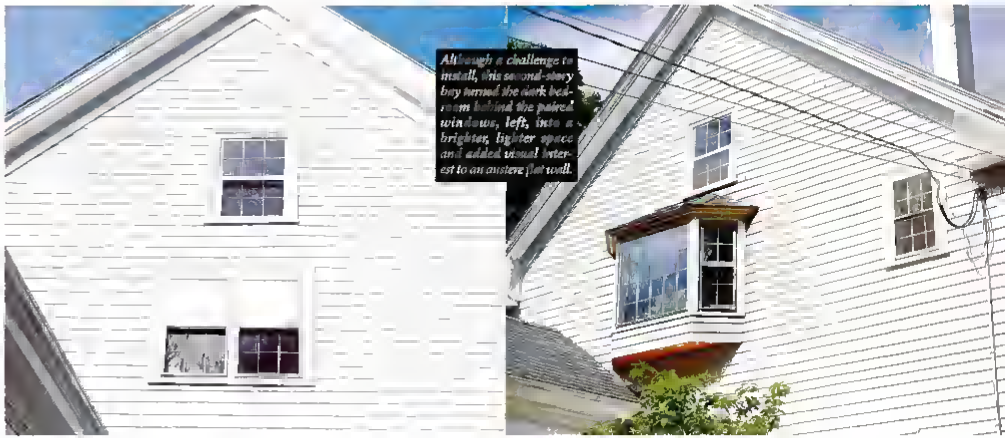
BY BRAD LEMLEY



Although a challenge to install, this second-story bay turned the dark bedroom behind the paired windows, left, into a brighter, lighter space and added visual interest to an austere flat wall.

THREE-DAY BAY

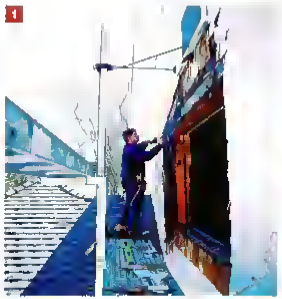
Why it takes so much time and money to put in a window

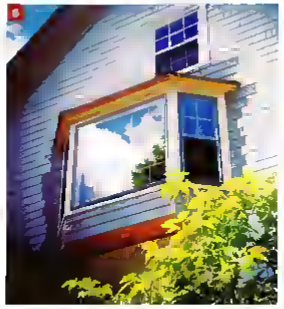
A bay window protruding from a house is a sweet revolt against flat, stark walls, an exuberant endorsement of old-fashioned pleasure over modern minimalism. In its cozy, three-sided embrace, we can enjoy the majesty—and ignore the wrath—of howling winds and driving rain. In an older house, where a picture window might be a desecration, a bay is often the only appropriate way to enlarge the window. Although a bay window adds just a half-dozen square feet to the room's footprint, sunlight spraying through it can make the space seem a third again as large.

Gaining those gentle blessings requires violent remodeling. To create space for a new bay at an 1880 carriage house in Ipswich, Massachusetts, Tom Silva jabs and slashes his reciprocating saw into the shingled east wall. Standing on a metal platform 15 feet in the air, following a pencil line that defines the window's rough opening, he roars through a hodgepodge of the dimension lumber added when this post-and-beam stable was converted to a residence. "This wall has been Mickey Moused around over the years," he grumbles, but the blade, oblivious to any structural vagaries, plows on.

This second-story job is a particular challenge, but for Tom's client it's essential. Homeowner Michael Burns, a former

PHOTOGRAPHS BY KELLER & KELLER





Build me a bay

1. *Tom Silva's reciprocating saw slices through shingles, sheathing and studs. He frames out the rough opening with 2x4s and a club sandwich header made with alternating layers of plywood and 2x8s.*
2. *Tom and brother Dick pump-jack the bay, minus windows, to the second floor. Taking out the sash "makes it lighter and removes the risk of breaking the glass," Tom says.*
3. *The men slide the bay into the opening with the help of a 2x4 handle tacked across one window. Once the window is leveled, Tom sheathes it in place by screwing it to the header.*
4. *Tom ties thin steel cables to zigzag anchors on the bay's roof frame. The cables support the window corners and make leveling a cinch.*
5. *The addition of a window seat gives this prefab bay a custom touch. Here, in preparation for lowering the factory-installed seat board, Tom sheathes the extension of the bay's bottom.*
6. *From their bedroom, the owners now have a panoramic, bird's-eye view of their property.*

actor given to theatrical expression, says his master bedroom was "terribly long, low and dark." He believes the bay will be "absolutely transforming," enlarging the vista of the east lawn and its surrounding ring of spruce and pine.

Tom is up to the task, having installed more than 60 bay windows in the last 32 years. Fifteen minutes after he begins sawing, a 7½-by-5½-foot hole yawns, flooding Burns's bedroom with light. Along the bottom of this opening, Tom erects a short stud wall, which will support a window seat. Across the top of the hole, Tom and his brother Dick wedge a new header made of three 2x8s and two pieces of half-inch plywood. In this case, the header doesn't support the wall above; the gable-end studs Tom cut carried no significant load. It's the header's job to resist the outward pull of a window thrust a foot and a half from the wall. Laden with one or two lounging humans and a half dozen potted plants, a bay without such reinforcement "can really make an old wall bulge," Dick says.

Even when secured to a header, a bay needs additional reinforcement to stop it from sagging. The best way to combat a bay's tendency to droop is with concrete piers or a foundation, but in most retrofits that's expensive, and it works only on ground floors. Exterior wood brackets, which builders once used to bolster bay bottoms, are structurally dicey because over time the window's weight will cause them to bend.

The third way is to suspend the bay from the wall. For years Tom hung his bays from steel strapping salvaged from lumber bundles. "It was a real challenge to get the straps taut and the whole thing level," he says. So he eagerly adopted a cable support system when it debuted in the late 1950s. This 150-pound factory-built bay will hang from two hidden quarter-inch steel cables, each rated for a 500-pound load, that snake up from

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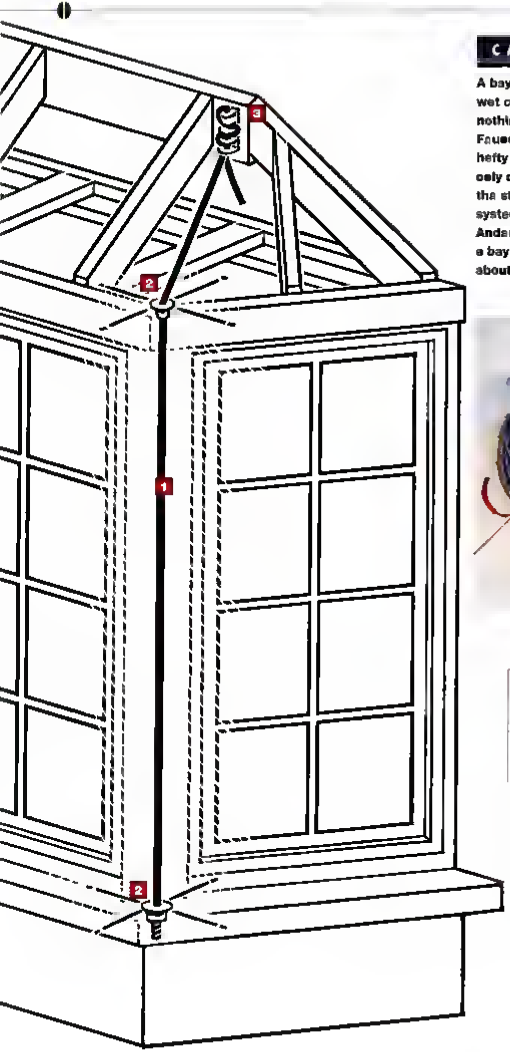

ILLUSTRATIONS BY CLANCY GISSON

CABLE READY

A bay window will droop like wet cardboard if there's nothing to hold it up. Foundations stop sags, for a hefty price, but they work only on first-story bays. With the steel-cable suspension system, introduced by Andersen Windows in 1987, a bay can be installed just about anywhere.

Using the cable kit provided, Tom Silva threaded the stainless wire (1) through metal eyes (2) on the bay's ceiling and seat and bolted one end to the seat bottom. He laced the other end through a zigzag tie down (3) and easily pulled it tight. Interior trim nailed over the mullions hides the cables, disguising the fact that anything is holding the bay aloft.

the seat board, behind the two front corners and attach to a beam above the header. "The big advantage of the cables is adjustability," Tom says. "You can easily bring the whole unit up or down to make it perfectly level."

Out on the scaffold, Tom clears a swath of shingles around the opening and covers the exposed sheathing on both sides with eight-inch-wide splines of 15-pound builder's felt. The felt offers protection should any rain sneak past the caulk, shingles and trim that Tom will install after the window is in place.

With the opening framed and felted, Tom climbs down and turns his attention to the prefab bay. First, he and Dick remove the window sash to lighten their load. Then he snaps a chalk line across the headboard, the bay's plywood ceiling, to indicate just how far to shove the unit into the hole. Atop the headboard he builds a ladderlike framework of 2x4s to stiffen it against the cables' inward thrust. With the windowless bay loaded on the scaffolding, they slowly pump-jack the unit up to its new home and slide it into place. Unlike a typical installation by mortals, it fits perfectly the first time. Tom quickly fastens the framework to the header with his cordless drill/driver to stabilize the window, cribbing on the scaffold takes most of the weight.

The bay's little hip roof is next. Using three 2-bys attached to the sheathing, Tom outlines the roof's shape on the wall. He makes sure the 2x6 ridge is screwed into an existing beam so he has a secure spot to anchor the cable tie-downs. Because the cables will pull mightily on the tie-downs, Tom drills a pilot hole for each screw. If the hole's diameter is slightly smaller than the screw shaft, "predrilling makes the screw grip better," he says. Tom pulls the cables taut, then Dick fine-tunes the window level by twisting nuts beneath the seat board. "I bring it one sixteenth above level," Dick says. "That allows it to settle."

Tom takes the three short rafters,

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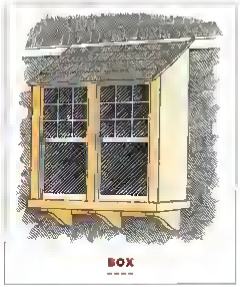
Bay Watch

Some bay windows harmonize gracefully with the rest of the house. Too many others are the architectural equivalent of blisters—weird swellings that don't belong. Before installing one, "you must consider two things: the era of the house and the proportions," says Reneau de Beauchamp, a period design consultant in Decatur, Georgia.

BAY

On Colonial homes of the mid to late 18th century, "bays are mostly limited to commercial structures—you see them on the shop fronts of Williamsburg," de Beauchamp says. More common on residences was the box window, a bump-out with 90-degree corners versus the bay's 30, 45 or 60 degrees. "Bays became popular in the early 1800s, mostly in rural areas," he says, and were confined to the sides and backs of houses.



BOX

Bays came into their own on Gothic and Second Empire homes of the late 1800s, and proliferated on gingerbreaded Queen Annes. The curved bow—rarer than the bay or box—was popular on the latter.

Bays were done in by the restraint of the Colonial Revival. They survived, mostly as box windows, on Arts-and-Crafts homes in the early decades of this century, but not on postwar housing. Ranches and pseudo-Colonials were generally devoid of bay-window flamboyance—and, to be true to their origins, should remain that way.

BOW

custom-cut to fit the undulations in the old wall, and quickly screws them down. He grins when asked how, exactly, he measured where to place them. "Measure? Measure?" he says in mock confusion as he arranges them into what appears to be perfect spacing. After 32 years of building, Tom doesn't have to measure everything.

He lays a polyethylene vapor barrier on the headboard, then stuffs fiberglass insulation beneath the rafters. The roof is next: half-inch plywood sheathing covered with a sticky sheet of bituthane (a waterproof membrane that helps prevent ice dams), and flashed at the eave and peak with aluminum. As Tom nails down the asphalt shingles, he weatherproofs the wall next to the roof hips with painted aluminum step flashing. (He doesn't bother ventilating his bay roofs, and not one has ever failed.)

To make space for the seat, Tom builds a plywood sheathed box and mounts it to the window's underside. Once he nails up the new tanks of cedar shingles on this box and around the unit, the outside will be weathertight and paint-ready.

Inside, to make the seat itself, Tom slices out the existing seat board with his reciprocating saw and drops a new one onto the short stud wall he built earlier. "Now it's seventeen inches off the floor—that's the right height for a good chair." An angled skirt board covers the gap between seat and window bottoms. "The pillows will go against that, so you won't see them from the street," Tom says.

As Burns predicted, the now sun-washed bedroom is transformed. Hot tea, good books, dozing cats, light-hungry plants and cabin feverish people will no doubt jockey for position in this bright alcove.

But watching Tom and Dick contend for three days with a staggering array of construction details leads to the conviction that installing a bay window is not for amateurs—a notion Tom confirms. "With a bay, particularly on an old place like this," he says with a sly smile, "it's useful to know what you're doing." ■

FOR SOURCES, SEE DIRECTORY—PAGE 151

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THE HOME DEPOT

presents

MILLS PARKE NOVA CABINETS W/ SONARTI COUNTERTOP

The Kitchen & Bath Renovation Planner

If you're currently considering redoing your kitchen or bath, you're not alone. According to the National Association of the Remodeling Industry, kitchen and bath makeovers top the list of projects in most American homes today.

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Renovating the kitchen & bath

Renovation can improve the resale value of a home, it can promote family harmony or it can just breathe new life into dated decor. Whatever your motivations, if you're like most homeowners, you'll soon be facing endless questions and choices—should you completely rework, or just add new accents and colors. Should you do the work yourself, hire a pro, or do a little of both? This guide, presented by The Home Depot®, is designed to help you plan, organize and execute a successful kitchen or bath remodel—bringing you through the process and options so that soon you can make your dreams a reality.

Why You Should Remodel

Remodeling consumers run the gamut from new home buyers to longtime owners. Today, more and more, community-grounded homeowners are deciding to "stay put"—they'd rather renovate than move and are transforming their homes to suit their changing needs. The kitchen and bath are obvious places to start—the kitchen is often the center of activity for families, and a functional and comfortable bathroom is invaluable.

When you decide to put your personal stamp on your home's design, be sure to keep an eye on your overall investment. Use your neighbors' homes and the local real estate market as a benchmark so you don't spend more than you can recoup on resale. Also factor in how long you plan to live in your home—a good rule of thumb is the three year mark. If you plan to leave your home in three years or less you may want to limit your plans to a minor facelift—new paint, wallpaper, lighting, a new or refinished floor and updated appliances.

Where To Begin?

Congratulations, you've just joined the 32% of Americans who say they are planning to remodel their kitchen or bath. The first step is to define a budget. If your needs outweigh your finances, you may want to consider doing the project in phases. Or, you may want to consider taking on some of the work yourself. Nearly half the cost of a typical remodeling project is labor and overhead, and reducing labor costs may allow you to invest in higher end materials and appliances. To get you started, The Home Depot offers everything from basic project advice to a range of free do-it-yourself clinics covering everything from laying tile to installing bathroom fixtures.

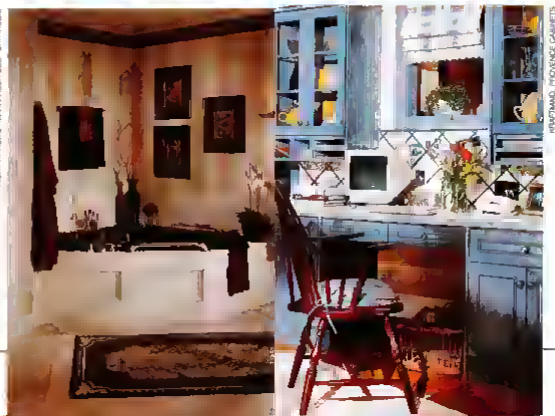
Next, you'll want to determine your priorities. To identify what bothers you most about your current kitchen or bath, step back and objectively survey the room—is it the size, the layout, the lack of storage? To detail your needs, The Home Depot offers this checklist:

- How long do you intend to stay in your home?
- What is your primary need in the kitchen? I.e., storage, improved layout, increased countertop areas, updated colors and styles, etc.
- What are your primary needs in the bath? I.e., more space, improved layout, better lighting, better ventilation, separate tub and shower, etc.
- Does anyone in your family have any special needs/physical limitations to consider?
- Are there any other activities? I.e., home office, utility room, sauna or steam room, that you'd like to incorporate into the existing space?
- What is your preferred decorating style?

Next, you'll need detailed measurements to estimate materials and installation costs. If you're reluctant to create your own kitchen or bath diagram, The Home Depot offers an in-home measuring service to ensure precise dimensions.

Armed with a realistic budget and a set of priorities, you'll need to decide whether you'll be doing the work yourself, with the help of a professional, or a little of both.

MILLS PRIDE HARTFORD PROFITT MAPLE CABINETS



FRONT: AT HOME MARRAKESH DEEP BATHROOM

HEARTWOOD PROVENCE CABINETS

Hiring Outside Help

Depending on the extent of the project, remodeling your kitchen or bath can disrupt your household for an extended period of time. Hiring a dedicated professional who is skilled in project management can shorten the length of your project.

How can you find the right contractor? The neighborhood grapevine can be an excellent resource, as can friends and business associates who have had similar work done. The Home Depot can also arrange to have many projects done for you, whether it's a small job like installing a new floor or countertop or a larger job where cabinets, counters and other components are being replaced. And, Home Depot guarantees all products and work done.

When interviewing anyone who may work on your home, be sure to check their references and their past projects. Your state consumer protection and/or contractor licensing agency can also provide you with information on your contractor's licensing status and any history of complaints. It's best to obtain at least three bids—be sure to provide each contractor with the same specifications so that everyone is estimating the same job, and try to be exact about materials and finishes. Most building professionals caution homeowners about automatically accepting the lowest bid. Very low bids may reflect incomplete estimates that don't factor in all elements of the job or the specific materials needed.

As a precaution, be sure to check the status of your contractor's insurance coverage. He or she should carry both liability and workers' compensation coverage. If your contractor is uninsured, you will be responsible for any medical costs or property damage costs that occur. Subcontractors, unless hired by the general contractor, should carry their own policies.

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Ideas & Options

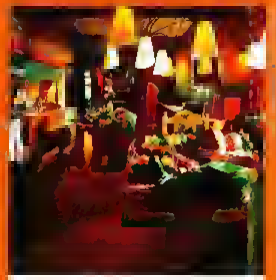
Kitchens:

Cabinets – With today's selections of finishes, handsome hardware, architectural details and interior storage options, new cabinets can significantly impact the design style and functionality of a kitchen. From country kitchens to sleek European designs, The Home Depot's kitchen and bath designers can help you select the right cabinets for your tastes and budget. The Home Depot's designers are all trained by the National Kitchen and Bath Association and provide state-of-the-art assistance with room layout and product selection.

Many families need their kitchen to serve double duty—adjoining a home entertainment center or mud room or housing a home office. In such case, traditional kitchen cabinets can be ideal solutions for storage. In fact, many manufacturers supply items, such as file drawers and pigeon hole organizers, specifically designed for home offices.

The architectural details found in many cabinet options—moldings, pilasters and cutouts—can add style and elegance to any room. To create an interesting design effect, consider varying cabinet doors. Choose some with cutouts, some with glass fronts and some that have been colorfully stained and painted.

The Home Depot offers special order cabinets manufactured to furniture quality in a wide variety of finishes. They also stock Mill's Pride cabinets—flat packed and ready to go.



Flooring

Traffic patterns and potential wear and tear should be carefully considered when selecting flooring

Choices include:

Hardwood – offers warmth and "give" underfoot and urethane and acrylic finishes protect from spills and wear. Wood floors do require occasional refinishing, especially when used in high traffic areas.

Pergo – Popular across Europe for over 15 years, Pergo laminate flooring is more durable than wood or marble and great for high traffic areas like kitchens and family rooms. Pergo looks like natural wood, yet it resists stains, furniture marks, scratches and fading.

Ceramic tile – a durable yet hard surface underfoot. Ceramic tile can be laid in distinctive patterns and will not scratch.

Vinyl tile – simple to install and repair, comes in a range of colors and patterns. Because of its easy installation, many homeowners choose to install vinyl flooring on their own.

Carpeting and area rugs – inexpensive and soft underfoot, but may retain spills and odors.

Countertops – Countertops team with cabinets to create the overall design statement in the kitchen. Choices range from plastic laminate to solid surfacing to wood to ceramic tile to granite. To determine the best counter surface, consider the function of the area you're covering. Ceramic works best near stoves for laying down hot pots, wooden butcher block is often used in the center island for slicing and dicing, and laminate and solid surface can work everywhere else.

A FRONT-MOUNT COUNTERTOP SINK MAY

The Home Depot offers homeowners custom counter fabrication. For a simple replacement top, customers can supply measurements. Or for a nominal fee, the store will send someone to measure. In projects costing more than $2,000, the fee is usually subtracted from the cost. A perfect fit and customer satisfaction is guaranteed.

The Kitchen Sink – Most designers begin with the sink in terms of placement and style, to set the tone of the kitchen design. The sink is the core of the food preparation area and forms one of the points of the kitchen work "triangle" – along with the refrigerator and range. There are many choices available, and, as with other kitchen fixtures, it's best to assess your needs before making a selection. Options include stainless steel, composite, enamel on-cast iron, enamel-on steel, solid surface and fireclay. Many manufacturers also offer special features like one to three bowls varying bowl depth and a host of timesavers like built in cutting boards, colanders, wire dish racks, lotion or soap dispensers, and high faucet spouts with pull out water sprayers.

Bathrooms:

As in the kitchen, the right sink for a new bathroom instantly sets the design style of the room. Bowl shape and material, teamed with complementary faucet spouts and handles, can create a look that ranges from sleek and simple to sculpted and luxurious. Unique options that are increasing in popularity for bathroom sinks are pedestal units, which feature a basin at a standing height resting on a distinctive pedestal support, and wallmount sinks. Wallmounts offer a great option for small spaces: the basin is hung from the wall with a small base support that conceals piping.

In addition to the luxuries, state-of-the-art fixtures, and creative storage options available for bathrooms today, it's important to keep safety and efficiency top of mind. Here The Home Depot offers its list for bathroom makeovers:

1) **Prevent scalding** – Without an anti-scald valve, flushing a toilet, using the sink or starting the dishwasher can divert cold water from the shower, delivering a blast of hot water up to 140 degrees Fahrenheit.

2) **Add a seat** – Install a seat in the shower for kids, elderly or disabled persons.

3) **Install grab bars** – One on the side wall and one on the back offer extra insurance against a nasty spill in the shower. Make sure they're anchored to a framing stud and not just glued or screwed into the wall.

4) **Use a dome light** – Be sure to ask for a shower light which has an extra thick shatterproof lens.

5) **Position water controls away from showerhead** – To test temperature at a safe distance.

6) **Expand your shower** – If your shower backs up to a closet, steal some space by taking out the adjoining wall.

7) **Use the right angles** – Maximize space with a neo-angle corner shower with doors set at a 45 degree angle.

8) **Multiple shower sprays** – For adults, set at regular heights. For homes with children, set one at a lower height.

9) **Safeguard appliances** – Have your electrician install a ground fault circuit interrupter in the bathroom. If there's a short, the GFCI will stop the flow of electricity.

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Pulling It All Together

Once the dirty work is done, putting the finishing touches on a room provides the real payoff. But trudging through the aisles with paint chips and wallpaper swatches is frustrating, and piecing together an entire room can be overwhelming. With so many choices out there – colors, textures, patterns, finishes – how can you tell what will work where?

The Home Depot can help. Each store features a design center staffed by professional designers, some of whom are members of the American Society of Interior Designers. At The Home Depot design centers, professional decorators on staff offer free in-store consultation. From assistance with flooring, wallpaper, window treatments and paint, to bringing it all together with lighting, The Home Depot's professional decorators can help with product

FAMILY KITCHEN

The Home Depot makes home decor easy with its Right At Home™ program.

The Home Depot has grouped everything from cabinets and countertops to wallpaper and window coverings into an easy-to-use decor system. Look for the Right At Home display in your local Home Depot design center. You can browse through sample books of design ideas and easily find each of the products necessary to create the look you choose.

Right at Home

selection and color coordination. And The Home Depot carries a wide selection of designer quality home decor products – from fashionable wall coverings to ceramic tile flooring to hand tied Oriental rugs – you'll find options for every budget and style.

Well, you've done your homework, weighed your options and made your choices; now it's time to begin the transformation process. As you embark on your project, be sure to keep the helpful tips in this guide handy. And feel free to call on the experts at The Home Depot every step of the way – whether it's for advice on installation, information about the latest products and technology or just to compare notes – they can't take you from dreaming to living.

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- Everything you need to do the job from start to finish
- Installation service available on some products
- Free advice and seminars for do it yourselfers

To receive a free copy of The Home Depot's *Kitchens and Baths* magazine, turn to the Homeowner's Hotline reader service section within this magazine.

The Legendary Architect Mies van der Rohe Said, "God Is In The Details."

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BY PETER JENSEN

This "pounder," so nicknamed because its abundant bristles can hold a pound of paint, once helped ship- and bridge-workers stab thick paint into seams and crevices. Faux finishers now use it to stipple rough surfaces. When loading any brush, keep paint away from the ferrule, or the dried flecks that collect there will end up on the finish.

HAIR ON A HANDLE

You can paint anything with a good p

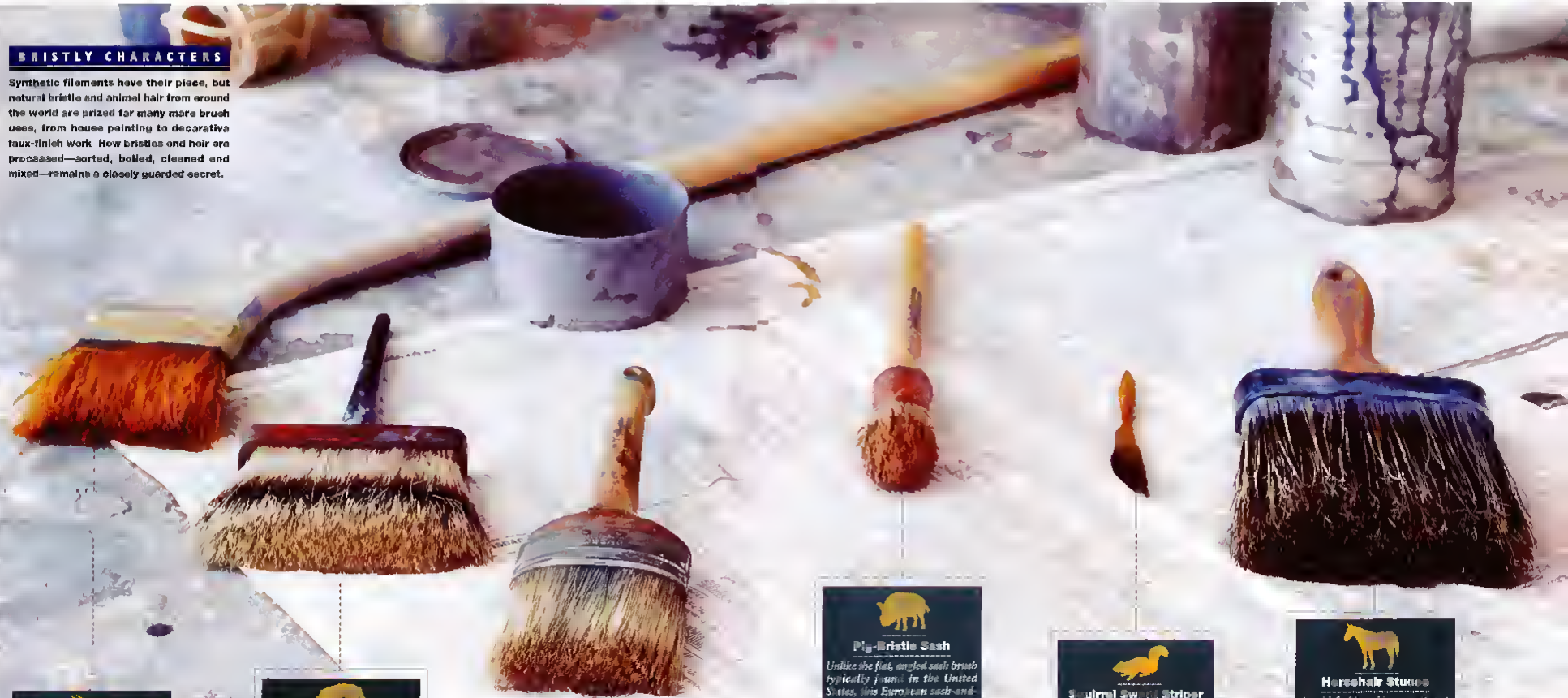
STYLIST: JEANNA RUNCKARDT

Stuck handle-down into the back pocket of his white trousers, painter Pat Chism's favorite China bristle paintbrush is ready for the first strokes of the day. Chism pulls it out with a swash-buckling motion and runs his fingers idly through the soft tips of the long black bristles. Despite several months of almost daily use in oil-base paints, the brush looks so clean he could lather up for a shave with it. He dips the brush halfway into a pot of viscous semigloss, then lays on and "tips off" a coat onto a door, primed wood disappears *(Text continued on page 48)*

PHOTOGRAPHS BY ANTHONY COTSIFAS

BRISTLY CHARACTERS

Synthetic filaments have their place, but natural bristle and animal hair from around the world are prized for many more brush uses, from house painting to decorative faux-finish work. How bristles and hair are processed—sorted, boiled, cleaned and mixed—remains a closely guarded secret.



Ox Hockey

Extremely soft, ruddy hair from the ears of the South American and Asian ox is blended with bristle for body. Hockey-style handle reaches high as it maintains proper brush angle to wall.

Badger Blender

Many who brush on shaving lather know the softness of badger. Faux finishers cherish its ability to blend and soften color. These fine 3-inch hairs come from Asia.

Bear-Bristle Oval

White setosa (triple-bleached bull or boar) bristle fills the ferrule of this Italian-made house-painting and varnishing brush. Call them hogs, boars or swine, but their hair—and only their hair—can be called bristle.

Pig-Bristle Sash

Unlike the flat, angled sash brush typically found in the United States, this European sash-and-trim brush is round in cross-section and has setosa bristles, set in rubber, that taper like a pencil tip. Perfect for painting the thin mullions on doors and windows. Old-time brush makers can distinguish between China bristle from pigs of windy Qingdao (it's long and soft) and that of Chongqing, where the hogs wear short, stiff, summer-weight suits.

Squirrel Swirl Striper

A short, flat handle, easily turned with fingertips, guides European blue squirrel-tail hair gripped in a copper ferrule. This limpest of all brush hair dangs a perfect line for pinstriping automobile pinstripes and painting signs.

Horsehair Stunner

An old-fashioned house-painter's brush has a pecan beaver-tail handle and a leather-bound, finger-cushioning ferrule. This style blends bristle with 30 percent Kashmir Coarse, brittle and non-flagging, horsehair was an adulterant used by unscrupulous brush makers during the bristle shortages of World War II.

ILLUSTRATIONS BY CLANCY ERWIN

Hand me a brush

But not just any brush. There's one for every job

1. *Block stippler with unbleached China bristle removes paint during faux work with flat tapping motion.*
2. *A six-inch-wide bristle flatting brush speeds wall and ceiling work.*
3. *Flagger (also called a dragger) simulates a wood grain effect.*
4. *Round "man help" fits onto a long handle or pole.*
5. *Pro stencil brush's short bristles stand up to constant dabbing.*
6. *Oval beel improves the brush's paint-holding ability.*

Human hair

Too limp to make a decent brush

Nylon-poly

Exploded tips simulate natural flagging

Ox hair

Soft, naturally flagged tips smooth wet paint.

Man-made bristle

The nylon and polyester filaments of this comfortable rubber-handled sash brush are equally at home in oil base or latex paint—as long as the same brush isn't dipped in both.

(Continued from page 45)

quickly beneath a glassy lake free of brush marks. Minutes later, the same brush nudges a perfect line of paint along a molding's edge.

Chism has the usual complement of modern painting tools, including spray rigs and power rollers, but in tight spots, when cutting in along walls and ceilings or finishing surfaces like cabinets and trim, he relies on that most ancient of tools—a brush. Brushwork is efficient. It doesn't require enshrouding a room, Christo-style, in drop cloths, plastic film and masking tape. Cleanup is faster. Control—with a little practice—can be as precise as a calligrapher's. And minus the cacophony of rattling compressors, hissing nozzles and crackling rollers, a brush lets a painter work in tranquility.

But painting with a poorly made brush is more slapstick than Zen-like, so painters learn early to separate the good from the bad. "It's like picking up a fine knife," says Fine Paints of Europe founder John Lahey, an importer of Italian-made paintbrushes. "You recognize the balance and other nuances of the better brushes right away." And you pay for it. Do-it-yourselfers accustomed to buying what pros call "throwaways" are often aghast at the cost of fine handmade brushes, not realizing that they can last for decades if properly cleaned and stored.

The best ones have bristles packed, glued and bound to handles so securely that it's easier to pull a hair from your head than pluck one from the brush. A cheap paintbrush, on the other hand, "sheds like a dog," says *This Old House* painter John Dee. But his litany of complaint doesn't end there. "Poorly made brushes are hard to control, can't cut a clean line or get paint to level and have a tendency to drip when going between pot and surface. They can be uncomfortable—poorly balanced—and just won't hold up to cleaning."

When the pros look for a good brush, the process is often more tactile than visual. Standing at a rack full of new brushes, they remove the stiff keeper protecting the bristles to make a close inspection. The business end gets a firm ring to see how well anchored the bristles are, then they push, stroke and fan the brush against the back of a hand or a chin, feeling for the softness that indicates supple, extensively flagged tips (the brush equivalent of a bad case of split ends). Like a legion of tiny feather dusters, these tips help smooth brush

MICHAEL PHOTOGRAPHY BY GREG ANTHON

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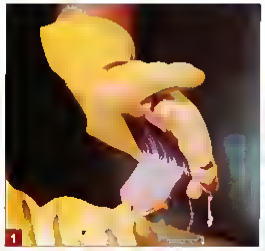
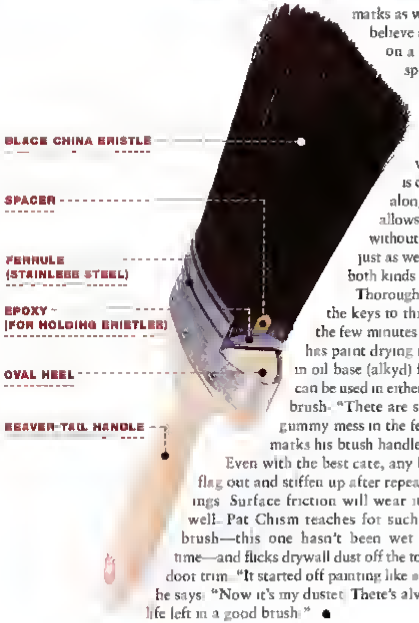
GET THAT BRUSH REALLY CLEAN



A good, expensive brush deserves to be cleaned well and often. With oil paints, wear rubber gloves and vigorously force thinner into bristles. Tip brush up to get solvent well down into ferrule.

Rinse four times (save thinner for reuse, solids will settle). After each rinse, spin dry by hand or with a brush spinning tool, then straighten bristles and banish paint particles with a brush comb.

Wrap bristles in a keeper so they stay straight. Store flat or hang. Brushes for some latex paints also need a dip in a water-rinsing solvent after a soap-and-water wash to rid the filaments of residue.

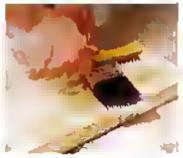


marks as well as push paint into a surface's microscopic crevices. Many painters believe a brush still does this better than any roller, sprayer or foam sponge on a stick. John Dee, for one, insists on brushing siding seconds after he spray-paints it, to better work in the finish.

A brush's construction determines whether or not it carries paint from the can to the wall for hour after hour with dripless legerdemain or needs frequent stops for reloading. Most ferrules are not packed solid with hair or filament. Spread them and you'll see a spacer plug, which creates a hidden reservoir that fills with paint each time the brush is dipped in the can. As the brush is stroked across a surface, paint squeezes along tapered filaments to be dispersed by the flagged tips. This void also allows solvent to penetrate deep into the ferrule area during cleaning. Brushes without spacers, such as the finest European brushes for oil-base paints, work just as well, Lahey says, the extra bristles lift more paint from the can. Dee uses both kinds but says the solid-packed brushes are harder to clean.

Thorough and frequent cleaning and matching the brush to the proper paint are the keys to this long-lived tool. A professional painter won't hesitate to stop for the few minutes it takes to clean a brush that feels saturated and unresponsive or that has paint drying in the filaments near the ferrule. Animal-hair brushes are best used in oil base (alkyd) finishes. Water makes them too floppy. Nylon and polyester brushes can be used in either paint, but avoid going back and forth between the two with the same brush. "There are solvents in latex paint that react with the oils in alkyds and leave a gummy mess in the ferrule," says John Dee. "Once it happens, the brush is ruined." Dee marks his brush handles—red for oil, blue for latex—and doesn't deviate.

Even with the best care, any brush will flag out and stiffen up after repeated washings. Surface friction will wear it down as well. Pat Chism teaches for such a stubby brush—this one hasn't been wet for some time—and flicks drywall dust off the top of some door trim. "It started off painting like any other," he says. "Now it's my duster. There's always some life left in a good brush." ●



"Reviving a rock hard brush," says painter John Dee, "starts with an overnight soak in water rinsing brush cleaner." Then wire-brush it against a flat surface. It won't paint like new but may be fine for outside work.

FOR SOURCES, SEE DIRECTORY—PAGE 161

CLEAR HIS PHOTOGRAPHS BY CHRIS BUCK. BRUSH CUTAWAY BY DARREN HORSEY.

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BY CURTIS RIST

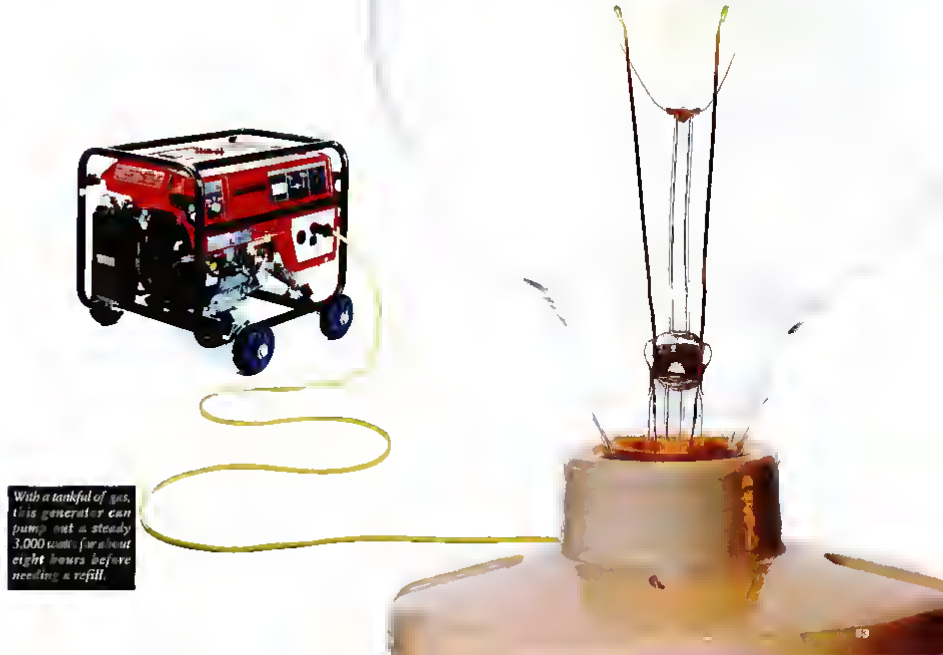
IN CASE OF EMERGENCY, PULL CORD

Stand-by generators deliver the juice when the lights go out

The Massachusetts winter of 1997 had been a mild one—until April Fool's Day, when Calvin Wilson of Lexington turned on the radio and heard bad news. Snow was on the way, heavy and wet, as much as two feet of it. Fearing the inevitable power failure, Wilson called *This Old House* electrician Allen Gallant. For about $1,000, Gallant outfitted the house with a 10-horsepower, gasoline-powered generator, large enough to keep the heat on and the lights running no matter how bad things got. "I just figured it was a small investment to make, compared to the very large cost of frozen pipes and wrecked drywall," says Wilson.

That simple cost-benefit analysis has sent sales of home backup generators soaring in recent years. GenTraCo, a distributor of a popular switch needed to plug generators into household circuits, reports that sales increased 150 percent

PHOTOGRAPHS BY IMKE LASS



With a tankful of gas, this generator can pump out a steady 3,000 watts for about eight hours before needing a refill.

last year. And snowbelt residents aren't the only ones buying them. Anyone living through a natural disaster—hurricane, tornado, flood or earthquake—survives more easily with stand-by power. Wells work, sump pumps pump, and life is a little more in control. "We're seeing an increasing demand from people who run home offices," says Peter Truss of Huntington Power Equipment in Shelton, Connecticut. "For them, losing a day's power means losing a day's work." And for anyone dependent on an electric medical device, blackouts are life threatening.

Plug and play

Small generators for jobsites or camping trips range from muscular, 4-cycle machines that crank out 2,500 watts or more, left, to dainty 2-cycle models, bottom, dragging 850 watts. Sizing is critical, the motor of a power-starved tool will work erratically and soon die. As a rule, a generator's output should be twice the wattage (amps x 120 volts) of all tools that will run together. Beware. Two-outlet generators often supply only half their total power to each outlet. A working generator is a shock hazard. To eliminate electrocution risk, run a 12-gauge wire from the generator's ground to a 1½-foot copper water pipe hammered into the earth.

Portable generators have long been available for lighting and construction-site tools, but the problem for homeowners in an emergency has been connecting them safely to the house circuits. Rigging a generator directly to a circuit board, an extremely dangerous procedure known as backfeeding, can explosively overload the wiring if the main power supply is restored while the generator is churning out watts. The two currents "meet like locomotives barreling toward each other on the same track," says Don Dunn of Dunn's Equipment in Haverhill, Massachusetts. Such an electrical collision can burn out the generator or start a fire, dwarfing the damage of a mere blackout.

The key to safe backup power is a generator transfer switch. It eliminates the risk of backfeeding by temporarily isolating the circuits receiving generator power from the rest of the house. When the main power returns, the homeowner flips a few toggles on the switch to reconnect the isolated lines and unplugs the generator.

What size should the generator be? On average, a household's total energy demand—the power needed to run everything from the furnace to the garbage disposal—is about 17,500 watts. But buying an unwieldy 17,500-watt behemoth in order to power every hair dryer and bug zapper in the house could cost up to $20,000 installed. If the list of must-have appliances can be pared down, so can the size of the generator. "I'm not as worried

Watts up, Doc?

A generator's output needs to be large enough to handle the brief start-up loads—measured in surge watts—of motor-driven appliances. Not all appliances start up at the same time, however, so a generator with a capacity 10 percent above the total running load should suffice.

Item	Running Watts	Surge Watts
Color TV	115-300	None
Computer	280-300	None
Freezer	85-100	400
Furnace blower	700	1,400
Garage door opener	700	1,400
Microwave	750	None
Oil burner	225-236	3,100
Oven	8,000	None
Refrigerator	800	2,300
Space heater	1,500	None
Sump pump	760	1,400
VCR	80	None
Washing machine	600-700	1,800-2,000
Water heater	1,000-5,000	None
Well pump	750	1,800-2,000

What if you're not at home?

Gasoline-powered generators and manual transfer switches are the least expensive backup systems, but they have an Achilles' heel: Someone must turn them on when the power fails. "What are you supposed to do if you're at work and you need power for a security system or a sump pump?" asks Peter Truss of Huntington Power Equipment. "Ask the neighbors to do it for you?"

Truss recommends and installs generators fueled by natural gas or propane that start automatically in the event of a blackout and feed power to the main distribution panel. "You don't have to do anything to it at all," says Truss. Except, perhaps, pay for it.

The smallest system, an eight-kilowatt unit housed outside in a three-by-four-foot weatherproof box, can easily cost as much as $10,000 including installation.

Truss's generators follow a weekly self-exercise regimen to charge batteries and lubricate pistons. Twice-yearly servicing costs $200 to $300 per visit, Truss says, or owners can do it themselves.

These generators will also kick in during brownouts, though not fast enough to save any open computer files. An additional instant-on battery backup is required to keep a computer running during the 20 seconds it takes for the generator to come up to full power.

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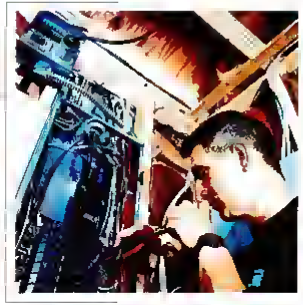
PERSONAL POWER STATION

The outside connection

Fume-belching generators have to do their work in open air, so the first thing electrician Allen Gallant installs on Calvin Wilson's house is a waterproof box with a plug that can be connected by extension cord to the outlet on the machine. Gallant drills through the sill close to the main breaker panel in the basement so the 10-gauge inlet wire will be short, minimizing voltage loss from resistance. He seals the hole with roofing cement.



The inside connection

Gallant moves to the basement, where he attaches a plug to the end of the inlet wire and locks it onto a generator transfer switch. The switch has six circuits, which can be wired into the standard 15- or 20-amp household circuits the homeowner wants to use in an emergency. The connections are easy, but Gallant emphasizes that there is no room for error, so this is a job only for licensed electricians.

The test that tells

After starting the generator outside, Gallant flips on his amp meter and confirms that the transfer switch is receiving power. To connect that electricity to the house after a power failure, Wilson will have to flip on each circuit manually. When power is restored, the transfer switch will prevent a catastrophic overload. Like the panel box it feeds into, the switch protects each circuit with a built-in breaker.

The homeowner's drill

In a blackout, Wilson will drag his generator out of the garage, plug it into the outlet box and start it with a pull cord, just like a lawn mower. His lights, furnace and TV will continue working as long as there's gasoline in the tank. Because generators are rarely used, they need periodic exercising—a full power run for 10 minutes each month—to keep them reliable. Adding stabilizer to the gasoline and running the tank dry will help prevent varnish deposits in the carburetor.

about meat going bad in the freezer as I am about people having enough light so they can get around without getting hurt," says Gallant.

Two top-of-the-list priorities for many homeowners are sump pumps and wells. Bottled water can suffice for drinking, but another predicament isn't so easily solved. "It's a problem people are very candid about," says Dunn. "They say, 'Help, I need a generator! I can't flush the toilet!' "

A backup generator's output must equal or exceed the total wattage of all the electrical necessities in a house. Anything smaller will dim bulbs and damage motor-driven appliances. "If a refrigerator doesn't have the correct voltage, you could hurt it," Gallant says. For most households, he recommends generators with a 5,000-watt output. Prices run the gamut, from $500 for economy pull-cord start models to $3,000 or more for versions with electric starting, wheeled cages and fuel-stingy diesel engines.

Wilson has no well or sump pump. He wanted power for his forced-air furnace (2,000 watts), some lights (1,000 watts), the television (150 watts—what else is there to do while a storm rages?) electric start gas stove (100 watts) and refrigerator (1,000 watts). Taking Gallant's advice, he settled on a 5,000-watt gas-powered model. Like any gas-powered engine that exhales carbon monoxide, it can only be used outside, never in a garage or basement. Within three hours, Gallant had the main panel connected to the transfer switch and outlet.

That night, as the storm howled, the power did indeed fail, Wilson gave his generator its first workout. He dragged it out of his garage, fired it up and plugged it into the outlet box. Inside the house, he pushed the switch toggles to "generator." He and his family had all the electricity they needed—and even shared some with neighbors, who dropped by like moths fluttering to the light. "We all watched TV like there was no power failure," Wilson says. "It was great." Until the storm knocked out the TV cable. But that, says Gallant, is another problem. ●

FOR SOURCES, SEE DIRECTORY - PAGE 161

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CONTENTS

62 **The Zen of Fall Fix-Up**
One man's secret to finding joy and satisfaction in home maintenance By Norm Abram

64 **Search and Seal**
Leaks slowly kill houses. Find them, fix them and thwart the enemy, water By Peter Jensen

68 **Wash, Rinse, Repeat**
Treat your paint well, and it will return the favor for years to come By Jeanne Huber

72 **Curing Common Cold**
Keep winter's chill out where it belongs by blocking costly heat losses By Curtis Rist

76 **Thermoperfection**
A little TLC keeps furnaces humming and puts money in your pocket By Don Best

80 **For the Love of Lawn**
Yards and gardens get sleepy in fall. Here's how to tuck them in for winter By William G. Scheller

84 **Rake Rhapsody**
If you like leaves, you'll love these leaf movers. They make the job more fun By Joe Carter

96 **Nature Attacks**
Clever ways to fight back when emergencies threaten to wreck your house By William Marsano

CONTENTS AND COVER ILLUSTRATIONS BY ZOHAR LAZAR

GUIDE DESIGNED BY GINA WHITE

BY NORM ABRAM PHOTOGRAPH BY KELLER & KELLER

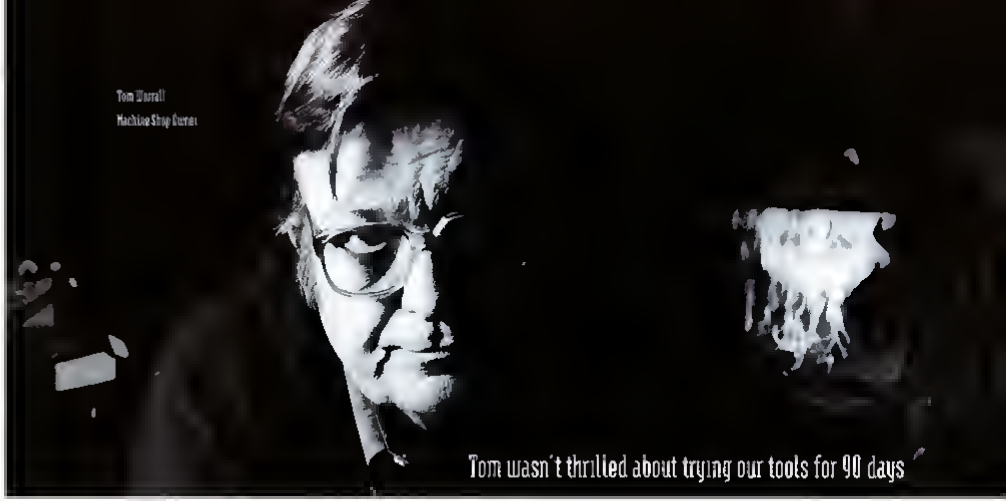
THE ZEN OF FALL FIX-UP

WORKING ON YOUR HOUSE FEELS GOOD, IF YOU DON'T OVERDO IT

PUTTERING IS ONE OF THE GREAT TRADITIONS OF HOME ownership. Part chore and part leisure, it represents all the ways we go about the house and yard, cleaning up messes, repairing damage, touching up wear and tear. It's maintenance the way you like to do it, at your own pace and in your own time.

Besides keeping your house in shape, puttering keeps you connected to it. From the curb to the chimney, if you go that far, you learn how your place handles time and the elements and what needs to be done when. That kind of knowledge can give you a good feeling but can also make your house seem like a never-ending string of chores, scaring you into doing too much too fast or, worse, keeping you from doing anything at all. Procrastination, of course, only leads to more work, but it's easy to avoid the trap. When there's a lot on your plate, prioritize. Focus on the one area that needs the most attention. That's the way I do it.

This fall I'll clean out the gutters, drain the sill cocks, varnish the front door threshold, straighten up the yard, smooth the gravel in the driveway and take care of a few other odds and ends. But I won't give over entire weekends to chore after chore. After I decide which one to tackle, I pull together the tools and materials and go to it. I'm eager to start because I can see that the end is only two or three hours away. When I'm finished, I'm satisfied that I've done my house duty and shortened my to-do list. Then it's on to what really matters: family and fun. ■



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BY PETER JENSEN PHOTOGRAPHS BY KOLIN SMITH

SEARCH AND SEAL

FIND THE LEAKS YOU DON'T KNOW ABOUT BEFORE THEY FIND YOU

OUR LOG-CABIN FOREBEARS WOULD HAVE loved the high-tech caulks and patching systems that protect modern houses from leaks. Yet despite their effectiveness, water is relentless, and, when it finds an avenue, the most damaging and crazy-making of adversaries. There's nothing like a torturous drip, drip, drip from a skylight, an attic full of sodden insulation or a deepening pond in the basement to ruin a day. "Anticipate leaks before they happen," says San Diego custom home builder Mac McCarter, whose first job in the construction trade 25 years ago was to find and fix leaks in every one of 127 new houses in a Southern California subdivision. "The source of many leaks is not always readily apparent. When I look for them, I feel like Sherlock Holmes in a rain suit. I've never lost respect for the amazing ways water can get into a house."

INSPECTION TOOLS

Leak hunting gets easier when you have the right gear. A putty knife scrapes at rust and corrosion. An awl probes for rotten wood. A utility knife cuts away decayed caulk. A flashlight illuminates crumbling mortar inside a chimney. A notepad records jobs to do and conditions to monitor, and helps create what will soon be a complete annual checklist. So does a point-and-shoot camera. Chalk or a permanent ink pen marks leak points. Rubber-soled shoes prevent a slip and fall. Binoculars bring you to places all but the agile feat to tread.

SPOTTING LEAKS FROM THE ATTIC

An annual tour beneath the roof may reveal pinpoints of light or an open seam where water is certain to enter. Examine rafters for telltale stains. Water travels. A leak can take a surprisingly busy route. Find its origin. Look closely where brick and mortar meet rafters; stains and crumbling mortar can mean a chimney's flashing isn't doing the job.

Plot a leak point's distance from major roof features such as the ridge and vent pipes, otherwise it can be difficult to locate the problem from atop the roof. Sometimes a small nail gently pushed up through the already leaking gap will mark the spot. Check the attic close to the eaves for stains and damaged insulation.

Poor attic ventilation and gaps in insulation let escaping heat warm a snow-blanketed roof, allowing water to run down to cold eaves. Subsequent ice buildup at drip edges and in gutters creates dams that cause water to back up under shingles and sometimes cascade into attics and down walls. The quick fix for this emergency, says *This Old House* contractor Tom Silva, is to deploy fans in the attic near gable or soffit vents to blow in cold air, chilling the roof and refreezing the snowmelt.

QUICK SHINGLE FIXES

Small roof leaks can be sealed with roofing cement, but a missing, storm-lifted, curled or cracked shingle should be replaced. Start by removing old nails with a flat pry bar and pulling out the bad shingle. Seal holes with roofing cement. Work a new shingle back in place under the overlapping shingles, fasten it with galvanized roofing nails and seal the

A new shingle takes its place among the rain-shedding ranks. This repair is best done on warm days when the shingles are pliable. OPPOSITE PAGE: *In the battle against leaks, simple tools, vigilance and a methodical approach produce the best results.*

> *Porches and decks are great, but they've kept carpenters in business for a long time because they self-destruct. Wood just doesn't do well horizontally.*
>
> —Norm Abram

heads with cement. Shingles in tricky spots, such as along ridges and hips and against flashing, should be repaired, not replaced. If they're totally shot, hire an expert. Repairing old wood shakes or shingles is trickier because they split easily. Carefully nail down loose or lifted shingles, then seal nailheads with roofing cement. Roofing cement can also heal splits. If shingles need replacing, soak the replacements in water for a few hours. Soaking mimics the swelling after a rain and lessens the chance of nail pop.

FLAWS IN FLASHING

Usually made of copper, aluminum or galvanized steel, flashing lines roof valleys and surrounds big and little protrusions—chimneys, dormers, skylights and vent pipes. It is vulnerable to sudden temperature swings, ice buildup, water torrents and acid rain, and over time, even corrosion-resistant metals can succumb. Inspect as much as you can see, looking for rust, holes, looseness, lifting. Recaulk nailheads, tears or gaps with roofing cement; tenail if necessary.

The flashing between the chimney and roof, as well as the overlapping counterflashing, must be snug and flat. Inspect the mortar, remove any that's brittle or cracked and repoint.

CHIMNEY AND MASONRY LEAKS

When water gets through brick or stone chimneys or walls, it's usually because of mortar gone bad. Use a cold chisel to clear the way for new mortar. It's easy to mix and simple to apply with the back of a trowel and a narrow brick jointer.

Water that finds its way down a chimney flue can react with acidic creosote to weaken mortar. Block the rain with a metal guard attached to the flue or a flat stone set above the opening. Also inspect the seam between the clay flue liner and the chimney and reseal with mortar or caulk as needed.

TOP: Good gutter screens let in water, keep out leaves and swing out of the way for routine maintenance. ABOVE: With a fresh application of mortar, a repointed brick wall is like new. RIGHT: The drip groove kerfed into the bottom of this windowsill stops water from finding its way behind the siding.

GUTTER CLEANING AND MAINTENANCE

If your gutters drain into underground pipes, resist the urge to blast gobs of leaves and other debris into the downspouts, which can slow or clog the drains. Instead, put on some old gloves and fish out the junk with your fingers, or use a long, skinny gutter scoop that fits down in the trough. Then hose gutters clean to check for low points and leaky seams. Caulk with gutter caulk. To patch a big hole, wire-brush the damaged area, seal a patch in place inside the channel with roofing cement (peel-and-stick patches are also available), then prime and repaint if necessary. While you're up there, make sure gutters are securely attached, especially in areas with severe winters.

To prevent leaf buildup, install wire or plastic mesh gutter screens. Add gutter mounted splash guards wherever roof valleys rush rainwater downward. Water splashing wildly over the eaves can wreak havoc in the garden below or end up on siding or against foundations that would otherwise stay dry. Downspouts that don't run into subsurface drainage pipes should empty onto splash blocks that direct water away from the foundation.

LEFT: An annual coat of driveway sealer stops water from seeping in and destroying the surface in winter freezes. BELOW: Regrading a foundation makes water flow away from the house.

WINDOW DETAILS

Some window leaks show themselves with drips and water stains, but others stay hidden, doing unseen damage. At the top of the window, flashing should cover the casing and run up under siding. Check to make sure the metal is intact and shaped to shed water at the sides.

At the bottom, take a look at the windowsill. A properly made sill has a kerf cut on the underside to stop water that—thanks to the miracle of surface tension—would otherwise flow up under the sill and soak the siding or sheathing. Sometimes these cuts gradually fill with paint, so check yours and scrape as needed.

SIDING, PORCHES, COLUMNS

Gaps and cracks allow windblown water to creep in and rot wood. Replace damaged siding and cracked caulk. Seal around windows and other openings, but not always at the point where siding and foundation meet, in wet climes, this gap may provide necessary ventilation to the back of the siding.

Use an awl to poke and prod wood for rot, fungus and other damage, especially where water splashes and pools or where wood isn't able to dry out.

FOUNDATION FIXES

Water that pools at foundations can seep through and dampen or even flood basements. For surface water to exit promptly, the ground should slope away from the house at least one inch every four feet.

A foundation crack is a water conduit and therefore vulnerable to ice damage. Clean, then seal, small cracks with a caulk formulated for concrete. Bigger cracks (more than a quarter-inch wide) require the traditional method. Use a cold chisel to clean and widen the fissure and to carve a dovetail-like channel to hold the hydraulic patching cement firmly in place as it expands. Trowel in the cement and feather the edges smooth.

DRIVES AND WALKWAYS

Cracked concrete walks can be repaired the same as foundations. At the expansion joints, commercial-grade polyurethane sealants keep water out and adhere tenaciously, if the joint is thoroughly cleaned.

Patching and sealing is a yearly ritual for homeowners who want to prolong an asphalt drive's life almost indefinitely. For potholes, give them a good cleaning and tamp in a cold patch of asphalt aggregate. To seal asphalt, pressure-wash the surface, let it dry, then put on sealer with an extra-large disposable roller or a short-bristle broom. Of course, all is for naught if a snowplow service drops the blade too low and continually gouges the surface. Remember hand shovels? Great exercise, no damage. ■

FOR SOURCES, SEE DIRECTORY - PAGE 161

Considering how often we wash our cars, it's surprising how seldom we hose down our houses. But house paint also benefits from regular grime removal. OPPOSITE PAGE. *After loose paint is scraped off with a flexible blade, edges of the remaining old paint should be sanded. Without this feathering, touch-up paint will be thin at the abrupt edge and will soon peel.*

BY JEANNE HUBER PHOTOGRAPHS BY KELLER & KELLER

WASH, RINSE, REPEAT

STEAL A DAY TO PROTECT YOUR PAINT AND SAVE YEARS OF AGGRAVATION

WITH ALL THE WONDERFUL WAYS TO PASS A sunny fall day, it might seem absurd to spend time attending to paint that's in pretty good shape. But a day's work now could add years to the life of your paint—and keep thousands of dollars in your pocket. "The most important thing homeowners can do to protect their paint is hose down their walls once a year," says Seth Knipe, the Massachusetts painter selected to work on *This Old House*'s fall dream house. Washing not only removes dirt and keeps paint looking good, it also helps expose problem spots on the siding and trim.

KEEP THE WOOD DRY

Before the wash down, walk around the house and look for anything that can hold water against wood. "Leaves are a big thing," says *This Old House* contractor Tom Silva. "They collect at the base of the walls and decompose." Dirt can build up too, and both can ruin paint and eventually rot wood. A few minutes of raking and shoveling will open a buffer between the siding and the ground. Aim for at least eight inches of clearance, but not if it means digging a moat around the house. The soil must slope away from the building.

Also prune shrubs and trees so they don't touch walls. "Without air flow, even a heavy dew may keep the walls moist," Knipe says. Moist paint helps mildew flourish and hastens the need to repaint.

WASH AND TOUCH UP

When you're ready to wash the walls, use a garden hose with a standard nozzle. And while you're hosing, inspect the paint. "Check the windowsills, the corner boards, around the garage doors," Knipe says. "Those are usually the first areas to peel." Scrape off peeling patches, sand them to smooth the junction with sound paint, spot-prime and touch up with fresh paint. After two or three years, what's on the house may have faded, and the touched-up spots will look glossier. "There's not a lot you can do about that," Knipe says, "but it does keep the paint from getting worse."

If you don't have leftover paint from the time the house was last redone, you can get a close match from many paint suppliers if you bring in a chip at least the size of a quarter. "The color-matching machines are so good, they can even duplicate the faded color," Knipe says. Be sure to stick with your current type of paint, which you can determine by how it peels. Oil paint (and its modern equivalent, alkyd) comes off in small, squarish, brittle flakes; latex yields larger, flexible swatches.

PRESS ON THE PUTTY

Where winters are cold, homeowners sometimes run a bead of caulk along the inside edges of triple-track storm window frames to seal out drafts. But come warm weather, when the storm pane is up and the screen is down, "rainwater collects like a lake behind the frame and rots out the sill," Tom Silva says. To prevent this problem, he drills two 3/16-inch weep holes in the bottom of the frame or into the sill, angled up so water can run out.

Scrape off any loose paint on the window frame or sill. If the putty (technically called glazing compound) around the glass is cracked, use a flexible putty knife to test its grip. "Don't force it out," Knipe says. "Just chip whatever's loose." If the cracks are small and the putty is still holding firm, simply press fresh putty into the cracks, then paint with at least a primer.

When large chunks come off, revealing bare wood underneath, you have a bigger chore. First seal the wood—and any other bare patches on the window frame—with an oil primer. After the paint is dry, press putty into the missing sections. "The warmer the putty, the smoother it will come out," Knipe says. He usually scoops up a handful, kneads it in one hand and

then rolls it between his palms into a cigar shape. Then he squishes it into place with a 2½ inch putty knife, pulling across the putty line. To smooth the patch, he runs the knife along the line at a 45-degree angle. "Go in one direction," he says, "and finish up by smoothing it with your finger."

Knipe waits at least a day for the putty to firm up, then primes it with latex or oil. "You can leave it like that if you're planning to paint next spring, or you can finish up with your trim color. To keep water from getting behind the putty, you should get a teal small amount of paint on the glass, in a straight line." Even for novices, it probably takes less time to paint carefully and scrape off any blotches than it would to tape off the glass, he says. For most windows, he recommends painting with a two-inch angled sash brush.

LEFT: Painter Seth Knipe blasts away weathered paint and wood to restore a sound surface to the shingles on an old barn. ABOVE: A piece of duct tape shows how the sun has loosened surface fibers of the wood.

PRACTICE PATIENCE

If there is so much peeling and cracking that only complete repainting makes sense, you'll have to hurry to get the job done this fall. Wait too long and all the good painters will be booked or the weather will turn too cold and wet. You may need to settle for spending the fall making needed repairs so you'll be ready to paint in spring.

If you replace any wood, though, don't leave it bare over the winter. "Sunlight degrades lignin, the glue that holds wood together," says Mark T. Knaebe, a chemist at the federal government's Forest Products Laboratory in Madison, Wisconsin. That makes the surface fibers—and the paint you cover them with—separate from the wood. Protect any new wood right away with primer; in spring, you can wash it, let it dry and reprime, and you'll be on your way toward a paint job that will last.

For wood that's severely weathered, Knipe removes the fuzz by scouring small areas with a green plastic pad that looks like an oversize pot cleaner. Sanding is also an option, but for large jobs, a power washer is the only way to go. Knipe uses a tip that emits a flat, four-inch-wide stream. Tom Silva recommends spraying at a pressure of no more than 850 psi.

If the surface has black splotches, test for mildew by dabbing with household bleach. Dirt won't fade, but mildew will. To kill this fungus and reduce the chance that it will grow back, squirt on a wood cleaner or bleach solution (one part of household bleach to one gallon of water). Wait 10 minutes, then rinse with the power washer.

After the washing is done, Tom counsels patience. "People think they can wash in the morning and paint in the afternoon," he says. "That's a big mistake. You might have to wait a week. It all depends on the weather and how much sun the wall gets."

When the wood is ready, coat it with a penetrating semi-transparent oil stain or an oil-based wood preservative followed by a latex stain (latex alone won't lock into the wood). With either approach, you should get a long-lasting finish that will gradually weather away, not peel.

Read labels to see what kind of weather is required. Latex formulas are especially weather-sensitive; most need temperatures above 50 degrees until cured. "If the day is cloudy and windy and the thermometer says it's fifty, but it feels like the upper thirties," Knipe says, "assume it's that low as far as the paint's concerned." ■

FOR SOURCES, SEE DIRECTORY – PAGE 161

Replacing missing putty and filling cracks is critical care for old windows.

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BY CURTIS RIST PHOTOGRAPHS BY KOLIN SMITH

CURING COMMON COLD

STOP HOT AIR FROM GETTING OUT, AND COLD AIR WILL NEVER GET IN

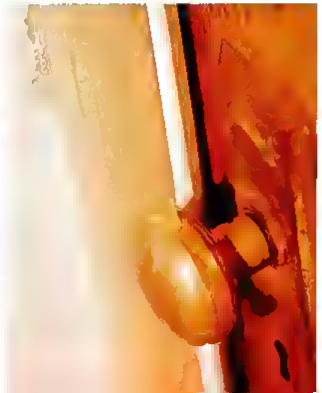
DRIVEN BY ADVERTISEMENTS, HOMEOWNERS frequently try one of two solutions to warm up a cold, drafty house. "They go up into the attic and toss around a few batts of fiberglass insulation," says Frazer Dougherty, a home-energy expert in Greenport, New York. "Or they go out and get new windows." Yet neither will guarantee a more comfortable house or even a lower fuel bill. "I just looked at a really big house where the homeowners spent $70,000 on new windows," Dougherty says. "But they still go to bed with their hats on." Such piecemeal efforts are bound to turn into expensive failures unless they are part of an overall strategy to tighten up a house from the basement to the roof. Done correctly, this can make any house more comfortable, whether it's subjected to a deep freeze or the occasional cold snap. And, says Dougherty, there's an added benefit: "These very same repairs will help keep hot air out of a house during the summer." The key to getting control of your indoor climate is understanding how air moves through a house. As warm air rises, it flies out of any available opening, including windows, doors and a long list of seams, cracks and penetrations. Cold air is literally sucked inside through holes and cracks down below to replace the exiting warm air. "One cubic foot of air goes out, one cubic foot of air goes in," says Fred Lugano of Lake Construction in Vermont. "You have to block that flow." In any house, there are a lot of places to look for leaks.

BASEMENTS AND CRAWL SPACES

The basement figures largely in the infiltration of cold air, even with the door to the upstairs closed tight. Air flowing in through cracks around the sill can be blocked with caulk or expandable foam sealant. Outdoor penetrations for wiring and spigots and the casings around doors and windows should be caulked, as should openings where cold air can flow up to the first floor, including those for water and heating pipes and around ducts.

Vented crawl spaces also pose a problem because they expose the floor to cold air. The floor framing can absorb potentially damaging moisture that rises up from the soil. Treat the floor as if it were over a basement by sealing any penetrations and putting insulation between the joists. To block soil moisture, spread six-mil polyethylene sheeting over the ground and cover it with a layer of sand or concrete.

Making a basement tighter is a worthy goal, but it can be overdone. To operate safely, gas- and oil-fired furnaces, boilers and water heaters need adequate amounts of combustion air. In a tightly sealed basement, they should get it from a nearby louvered window or from a duct that leads from the outside directly to the burner.



WINDOWS AND DOORS

When carefully weather-stripped, older double-hung windows can be made nearly as tight as new ones. There are several ways to do this, but they all involve creating a seal around the perimeter of each sash when closed. To keep most of the weather stripping out of sight, use thin strips of Q-lon, a slippery nylon-covered foam that makes it easy to slide a sash up and down. Staple the Q-lon to the outside edge of the stop for the lower sash and, for the upper sash, to the outside edge of the parting bead (see photo on page 75). A different type of weather stripping—a plastic V-strip—press-fits into a two-millimeter-wide groove routed into the meeting rail. To bridge the gap between meeting rail and stop, a bristled self-stick pad with an integral plastic fin seals the jamb at the top of the lower sash. With all this new weather stripping, the windows may be a little harder to open and shut, but they'll be a lot less drafty.

On at least three sides, doors are easier to weather strip. You can add seals to the existing stops or install new stops fitted with strips of Q-lon. Be careful not to press the strips too tightly into the door; that can make it harder to close. The

The dusty job of blowing insulation into an attic can dramatically lower fuel bills, but it's the last of several heat-loss fixes. The first is to methodically search out and seal any cracks that allow heat to escape and cold air to enter.

OPPOSITE PAGE: *Weather-stripping a door with an applied strip is a 15-minute solution that puts an end to drafts.*

TOP: A foil-covered foam box, sloped down with straps, minimizes the heat lost through normally leaky attic hatchways. Loosen the straps, and the lightweight box moves aside for attic access. ABOVE: A paintable silicone sealant keeps air from flowing the easy between clapboard and corner board.

bottom of a door presents more of a problem. Many sweeps attach to the door's inside for all to see, ruining the door's looks. But one type, a double-finned sweep made of silicone rubber, is concealed in a groove routed along the middle of the door's bottom edge. Once installed, it is easily adjusted to make a tight seal with the threshold.

RECESSED LIGHTS

Although newer versions of recessed lights contain an air-lock system that stops air leaks, older models do not, making them little more than heat vents opening directly into the attic. In attics with flat ceilings, one way to retrofit older models is to make a drywall box big enough to leave three inches of clearance between it and the fixture. That's enough space for the fixture to ventilate properly and doesn't create a fire hazard. Once caulked into place, the box can be safely covered with insulation. "It's not perfect, but it's better," says Dougherty. For recessed lights on sloped ceilings, and in kitchen and lower floor bathroom soffits—potentially big heat losers—the task is messier. To reach them, drywall has to be ripped out, after which new insulation can be installed above the old fixture or a more efficient new one.

> "Finding and plugging leaks in an old house can be more of a career than a weekend project, but it does make the place a lot more comfortable"
>
> — Steve Thomas

KNEE WALLS

In an otherwise tight house, knee walls—the short walls that meet sloped ceilings in the top floors of Capes and bungalows and in finished attics—are sometimes a big source of heat loss. Installing insulation between the rafters may seem like the best strategy, but it can leave the space behind the knee wall cold and drafty because batts alone are ineffective air barriers. A continuous sheet of four-mil thick polyethylene should be stapled to the rafters over the insulation. Caulk the seams along the band joist, or blocking, at the ends of the floor joists. To cut off another possible draft, install and caulk more blocking between the joists where they pass under the knee wall.

ATTICS

Rising warm air finds its way into the attic through gaps around wiring, ceiling-mounted light fixtures, plumbing vents, ductwork and the chimney. Small gaps can be sealed with expandable foam caulk. Larger ones should be filled with pieces of foam board, cut to shape and caulked in place. The only exception is gaps around the chimney. For fire safety, they should be covered only with sheet metal. Keep any insulation at least two inches away from the chimney.

Although interior partition walls don't require insulation, the tops of these walls can vent tremendous amounts of heat into the attic. If parts of the top plate have been cut away, or if quirky framing has left entire sections without a plate, the opening should be sealed with foam board caulked in place.

As with some partition walls, the stud cavities of balloon-framed exterior walls are sometimes completely open to the attic, which creates wide pathways for heat loss. These need to be sealed and caulked at the ceiling joists in the attic.

Attic hatches and ceiling-mounted whole house fans are the equivalents of large, gaping holes in the top floor. Both can be covered with boxes made of rigid foil-faced foam, assembled from a kit with foil tape and construction adhesive. Weather stripping lines the bottom edges, and Velcro straps pull the boxes tight to the attic floor.

INSULATION

Adding extra insulation can contribute much to a house's overall comfort and efficiency, but it's the final step and should be taken only after much air-sealing. "Installing insulation before you seal is only going to hide your problems, not solve them," says Lugano.

In colder climates, insulating the ceiling of an unheated basement is a good idea. Even though warm air rises, heat also radiates down through the floorboards. Here, fiberglass batts are useful because they fit easily around ducts, plumbing and wiring that run through the joist bays. They can be held in with wooden lath or plastic strips but should never be compressed. That diminishes their R-value. Not everyone needs to insulate the floor, however. "In Arkansas, and southern states in general, it's just not cost effective," says Royce Lewis of Comfort Diagnostics and Solutions in Little Rock. "The money can be better spent making other parts of the house tighter."

The best type of insulation for attics, Lugano says, is not fiberglass but cellulose or cotton, made by shredding old newsprint or fabric. To attain its full insulation value, either type must be unloaded from sacks into a special machine, which can be rented, that fluffs it up and pumps it through a four inch hose into the attic. Some say that six inches of insulation is enough, but Lugano prefers a full foot in Vermont, enough to cover the joists. And the same is true in warmer climates. "We go for twelve inches of cellulose minimum," says Lewis. "It takes at least that much to stop the sun from heating through the insulation in the summer."

RADIANT BARRIERS

Another attic improvement that will help to contain heat year-round is a radiant barrier. The barrier isn't thick insulation but rather a thin reflective sheet that comes in long, wide rolls. Stapled over the rafters, it reflects heat radiating from the backside of the roof, a considerable source of unwanted heat gain during the warmest months. That's its main benefit, but the reflective side facing the attic also slows heat loss during the cooler months. "Combined with traditional insulation," says Philip Farrey of the Florida Solar Energy Center, "it gives you extra energy savings." ●

FOR SOURCES, SEE DIRECTORY—PAGE 101

LEFT: A drafty double-hung window becomes almost as tight as a new one with some strategically placed weather stripping. Q-lon stapled to the stop and parting bead seals the sides of the sash. The V-strip goes across the meeting rail, the bottom of the lower sash and the top of the upper sash. The self-stick pad stops air from sneaking in through the jamb. ABOVE: Ceiling penetrations around old pipes and wiring deserve a shot of canned foam, the button-upper's best friend. BELOW: A router plows the groove for an adjustable door sweep that stays out of sight.

BY DON BEST PHOTOGRAPHS BY BENJAMIN OLIVER

THERMOPERFECTION

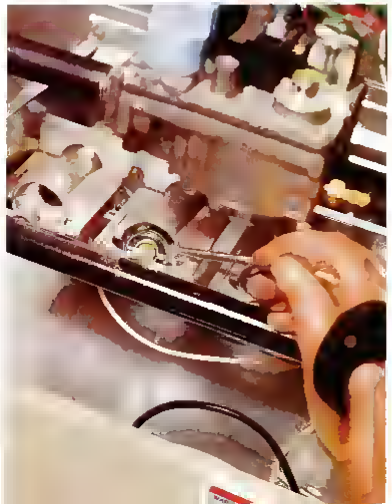
THE TUNE-UP THAT KEEPS YOUR HOUSE JUST RIGHT: NEVER TOO HOT AND NEVER TOO COLD

EOPLE WOULDN'T DREAM OF DRIVING THEIR CAR thirty thousand miles without an oil change, a tune-up and a new air filter," says *This Old House* plumber Richard Trethewey. "Yet that's exactly how they treat their heating and cooling systems." Indeed, like a car, heating and cooling systems burn more fuel—and are more likely to break down—without regular servicing. Heat pumps and oil-fired furnaces and boilers need a yearly tune-up. Gas-fired equipment burns cleaner and should be serviced every other year.

INSPECTING, CLEANING AND ADJUSTING

Before Ted Weinberg begins a tune-up, he talks to the owners. Weinberg, a heating systems specialist in Eastchester, New York, asks "if they're experiencing comfort problems or if any unusual smells or sounds are coming from the system. Have they done any renovation work since the system was last serviced?"

Next comes an inspection to uncover leaks, soot, rust, rot, corroded electrical contacts and frayed wires. In furnace (forced-air) and boiler (hot-water) systems, the inspection should cover the peripherals—chimney, ductwork or pipes, dampers or valves, blower or pump and registers or radiators, the fuel line and the gas meter or oil tank—as well as every part of the core unit.



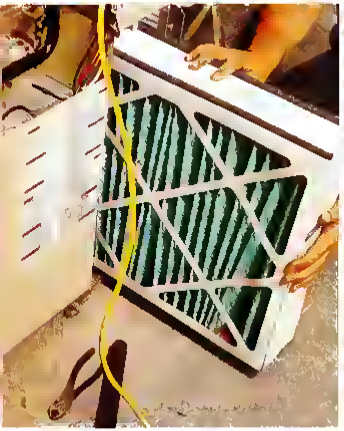
To complete the inspection, the system should be run through a full heating cycle. Furnaces and boilers must have plenty of combustion air and chimney draft. Otherwise, back-drafting can fill a house with toxic exhaust gas. Weinberg's crew uses smoke pencils to check the draft and an electronic analyzer to sniff the indoor air for carbon monoxide.

Next comes the dirty work: cleaning the furnace or boiler burner and heat exchanger to remove soot and other gunk that can erode efficiency. "A single millimeter of soot inside the combustion chamber can cut the efficiency of an oil boiler by six percent," Richard Trethewey says. Efficiency also hinges on adjusting the flame to the right size and color, adjusting the flow of gas or changing the fuel filter in an oil-fired system.

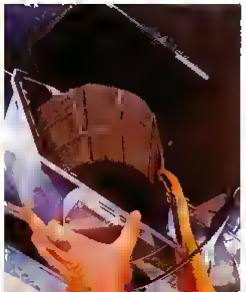
The checkpoints for a heat pump include the compressor, fan, indoor and outdoor coils and refrigerant lines. Indoor and outdoor coils should be cleaned, and the refrigerant pressure should be checked. Low pressure indicates a leak, and to find it, says Weinberg, "a contractor should inject tinted refrigerant into the loop or go over it with an electronic detector."

Tuning up the distribution side of a forced-air system starts with the blower. The axle should be lubricated, and the blades should be cleaned. The operating amperage of the blower motor should be checked to make sure the unit isn't being overloaded, a sure sign of a dying motor or bad bearings. The fan belt should be adjusted so it deflects no more than an inch when pressed. Every accessible joint in the ductwork should be sealed with mastic or one of the new UL-approved duct tapes. "Because of its poor history, regular duct tape shouldn't be used," Trethewey says. Any ducts that run outside the heated space must be insulated. On a hot water system, the expansion tank should be drained, the circulating pump cleaned and lubricated and air bled out of the radiators.

If an old thermostat gets out of whack, it can be recalibrated with some simple adjustments. OPPOSITE PAGE: A thorough tune-up for a gas furnace requires probing the burners with a small mirror to find soot or other deposits that can reduce combustion efficiency.



TOP: To keep it balanced, a furnace blower should be brushed and vacuumed free of gunk and dust.
LEFT: An in-duct media filter cleans air far better than standard filters.
BELOW: Besides adding needed moisture, a dirty humidifier can also put mildew and microorganisms into the air. Clean it often.



ADJUSTING THE BRAIN

While thermostats rarely fail outright, they can degrade over time as mechanical parts stick or lose their calibration. Older units will send faulty signals if they've been knocked out of level or have dirty switch contacts. Recalibrating an older unit requires a room thermometer and a small wrench. Set the thermostat dial at the temperature indicated by the thermometer. Use the wrench to adjust a nut on the back of the mercury switch, just until it turns the system on. With this adjustment, your thermostat will do the right thing at any setting.

Modern electronic thermostats rarely need adjusting. "They're calibrated at the factory," Weinberg says, "and they're sealed so they can't gather dust and grime."

But any thermostat, old or new, can be tricked into thinking the room is warmer or colder than it really is. The hole where the thermostat wire comes through the wall must be caulked or a cold draft will create a false call for heat. "We once found a new warm-air register installed right under a thermostat," says Weinberg. "It threw the room way off." Fixing that one required moving the unit.

FINER FILTERS

Furnaces have a built-in dust filter that keeps the furnace and ductwork clean but does little, if anything, to improve the air you breathe. That takes a whole new filter system—one that's built in between the main return duct and the blower cabinet.

A media filter, made of a deeply pleated paperlike material, is at least seven times better than a standard filter at removing dust and other particles. It costs about $200 installed, and a replacement filter element every two years costs $30 to $50. Because a media filter impedes air flow more than a standard filter, it may be necessary to compensate by increasing the blower speed.

Electronic air cleaners cost about $750 installed. "What's nice about these," Weinberg says, "is that you can clean the filter in the dishwasher and keep reusing it." And these units don't slow air flow, so there's usually no need to adjust the blower.

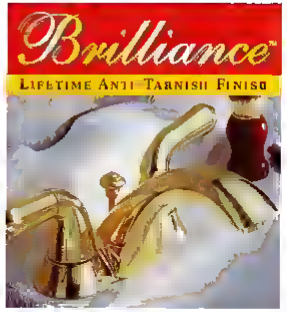
HUMIDIFIER CARE AND FEEDING

An in-duct humidifier that's neglected can breed mildew and bacteria, not to mention add too much moisture to a house. A unit with a water reservoir must be drained and cleaned with white vinegar, a mix of one part chlorine bleach to eight parts water, or muriatic acid. Weinberg recommends treating the water in the reservoir regularly with chlorine or bromide tablets to keep microorganisms under control. Reservoir humidifiers also have small, slow-speed motors that need a few drops of oil once a year. Mist type humidifiers require regular cleaning too—with the same chemicals—to remove mineral deposits. A common mistake with humidifiers is leaving them on after the heating season ends. Don't forget to pull the plug, shut the water valve and drain the unit. ■

FOR SOURCES, SEE DIRECTORY – PAGE 181

THE PROBLEM: TARNISH

THE SOLUTION:



THE STORE:

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BY WILLIAM G. SCHELLER PHOTOGRAPHS BY KOLIN SMITH

FOR THE LOVE OF LAWN

NOW IS THE TIME TO SHOW YOUR DEVOTION

LIKE KIDS WHO DON'T KNOW HOW TIRED THEY REALLY ARE, yards and gardens can't just go to sleep on their own—they have to be put to bed. The horticultural versions of warm milk and a good story vary from place to place in the garden, but the one sure thing is that there's a lot more to maintaining lawns, perennials and shrubs than raking leaves. And attention offered now will assure a safe passage through winter and make your yard more vibrant when it awakes next spring.

TURF CARE

Fall is the best time to nourish cool-season grasses such as Kentucky bluegrass and tall fescue. Dave Chalmers, turf specialist at Virginia Polytechnic Institute, recommends a fall fertility program for September, October and November. First, he says, test whether soil pH needs to be adjusted. A low pH (under 6) indicates acidic conditions, which will limit absorption of nutrients such as potassium and phosphate. Adding lime will raise the pH. "But it can take three to six months for lime to break down," says *This Old House* landscaping consultant Roget Cook, "so it makes sense to let that happen over winter."

To thicken grass and promote root development, soil with a balanced pH should still be fertilized with one pound of actual nitrogen per 1,000 square feet of lawn, divided into three equal doses and applied in September, October and again in November. Whether you use organic types such as fish meal or synthetic creations, figure out how much actual nitrogen is in a bag by multiplying the percentage listed on the label by the package's total weight.

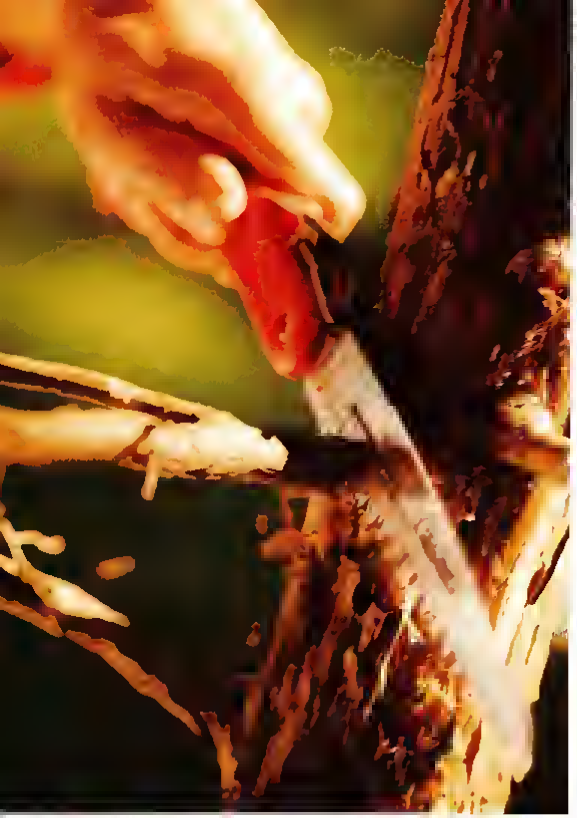
"Ideally, the treatments should be four to six weeks apart," Chalmers says. "Farther north than the mid-Atlantic region, you can start earlier; farther south, a little later. If you want to cut back to two treatments, do them in October and November. If you only have time for one, go with October."

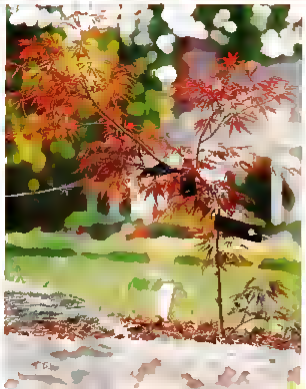
Many landscapers cut grass shorter as the season advances, down to 1¼ inches as opposed to its summer height of 3 inches. Left long, turf invites snow mold and fungus diseases. Plus, with less dead grass in the way, a close-cropped lawn will green up faster in spring. Beware, however, of cutting too low. Tom Delaney, a spokesman for the Professional Lawn Care Association, says that scalping the grass, especially in early fall, removes too much of the upper blade, where the plant makes most of its food. So bide your time and wait until the grass has stopped growing before you shear.

Autumn winds will blow off some lawn-bound leaves, but before the snows come, the rest have to go or they'll damage the turf. Wet and compacted, leaves feed grass killing fungus and mold. A bag-equipped power mower can vacuum them away. Make sure leaves end up in the compost pile, because half baked, homemade compost is the best thing you can spread on the garden in autumn. Although mowing or blowing the leaves away is faster, raking has other benefits: breaking up thatch and stirring the surface of compacted soil.

Finally, fall is a good time to overseed thin areas or bare patches. Rough up the patches with a rake, but not so vigorously as to damage healthy grass. Keep the seed well watered while it germinates and gets established.

Bagger mowers can turn leaf-raking into an easy Sunday drive, vacuuming wide swaths in a single pass. The blades chop up the leaves and turn them into a dense, compact pile that quickly ripens into compost. OPPOSITE PAGE: *Fall is a good time to patch bare spots in a lawn, but seeds will be wasted if they don't come in contact with soil. Rake to loosen the surface, sprinkle on a handful of soil, then spread seeds and rake them into the soil.*





ABOVE: *Dead branches should be cut close but not flush with the trunk. With large limbs, avoid a bad break by first cutting off most of the branch, then trimming the stub.*
LEFT: *Shape and protect young trees by securing them to stakes.*

PERENNIAL PROTECTION

What perennials want most in autumn are nourishment and protection from extreme temperature swings, but before you attend to their needs, give yourself a present. Early fall is prime time for moving summer blooming perennials that don't quite fit where they are now and for dividing large clumps to expand your planting beds or to share with a friend.

After the first freeze, cut perennials to the ground. "If you cut too early, a plant will send out new growth," says Laurence Sombke, author of *Beautiful Easy Flower Gardens*. "That will draw on resources it needs to get through winter. You want it to drift slowly into hibernation, not sprout late in the season."

> *It can take three to six months for lime to break down, and it makes sense to let that happen over winter*
>
> —Roger Cook, *This Old House* landscaping consultant

Fertilize the beds with a two-inch layer of compost or well-rotted manure, so nutrients will be available when growth begins in spring. The perennial diet should also include plenty of water, especially after a dry summer or in regions where rainfall is sparse. Make sure plants get at least an inch a week all through October and November. "You're lucky if you have a rainy fall," Sombke says.

Late in the fall or early in winter, gardeners in cold climates—Zone 5 and north—frequently cover newly planted perennial beds to prevent roots from heaving as the ground freezes and thaws repeatedly. One effective insulating tactic is to lay down evergreen boughs, which are available in abundance after Christmas when trees and wreaths are discarded. Near the seacoast, salt hay is a popular blanketing material, and common straw is available everywhere. Neither contains the seeds that infest regular hay. Many gardeners use leaves, which can become wet and compacted if piled too high. Alternate layers with evergreen boughs and avoid oak leaves, which mat down into an especially dense mass.

SHRUB SERVICE

Wherever summers are dry, shrubs can suffer from the same water deficiency as perennials, especially if the area also has low winter precipitation. Like perennials, shrubs need an inch of water per week, September through November. But because soil stays damp longer in fall, probe for moistness with your finger before irrigating.

In cold climates, the biggest threats to ornamental shrubs are desiccation and physical damage from snow loads. Evergreens (including rhododendrons) transpire moisture through their foliage. Exposure to dry winter winds can accelerate this process, often leaving a shrub dangerously low on water and liable to browning. For plantings with no natural windbreak protection, the best solution is a careful wrapping with several layers of burlap. Another option is a spray-on antidesiccant, a waxy substance that helps lock moisture inside foliage.

Before snow threatens, protect vulnerable evergreen shrubs—such as those under roof eaves—by wrapping them with burlap or by setting a steeply sloped plywood tepee over each one. Simply join two pieces of exterior-grade plywood with a piano hinge, it'll serve for years if protected with a coat of paint. When shrubs grow too large for tents, sweep snow from boughs as soon as possible after a storm by stroking them upward with a broom.

Dead and dying branches should be removed. "Any plant will fare better in winter if it can concentrate its energy on healthy portions alone," says Sombke. "Dead branches put the entire shrub at risk for wind damage." When pruning, cut or saw as close to the adjacent live wood as possible, leaving little or no stub. But don't prune into good wood, especially on spring bloomers such as lilac. "Don't cut back any plant that sets bud on old wood," Cook cautions. "Wait until next spring after they flower." And don't reach for the tar—pruning wounds heal best when left exposed.

All shrubs should be mulched throughout the year to help retain moisture, keep out weeds and nourish the soil. Before winter, add an extra inch of mulch; shredded pine or cedar bark works well. In many communities, tree trimmers will drop off a load of chopped-up tree branches and leaves without charge. This makes great mulch, although it's less attractive than most bagged mulches until it weathers. The quantities that tree trimmers deal with are enormous—make sure you don't wind up with more than you want. Avoid leaf mulch in humid winter climates, where it can promote disease.

Protect thin-barked fruit trees and Japanese maples by whitewashing trunks to reflect sunlight, or by leaning a board against the southeast side of the trunk. This will prevent quick morning warming after a frozen night, which can cause frost cracks in the trunks.

And finally, set up barriers to protect shrubs from hungry animals. If deer are feasting on branches and bark, spray on a deer repellent (repeated applications will be necessary). Keep rabbits and mice at bay by girding trunks with quarter-inch hardware mesh. Extend it 18 inches above the soil surface and a few inches below. ●

TOP: *Like a cozy comforter, a thick layer of mulch can warm perennials and shrubs through icy winters. Mulch evens out soil temperature, helping to prevent sprouting from rapid freeze-thaw temperature swings, and it guards against drying.* RIGHT: *To ward off snow mold and fungus diseases and have a healthier lawn next spring, clip grass shorter for the final cut of the season.*

FOR SOURCES, SEE DIRECTORY—PAGE 161

Flip-flops
Nylon tines make this 12-inch-wide tool flexible enough for raking, sturdy enough for turning mulch

Extends reach
This 5-inch wide rake gets you up close and personal with yard debris. When your knees give out, you can attach a 34 inch extension handle.

Adjusts
Go from beds to turf with a flip of a lever that adjusts the width of the steel tined head from 7 to 24 inches.

Grooms
Reinforced with elegant steel bows, the 28 inch head has wooden teeth for grooming grass and soil.

Pushes, too
With its comfortable handgrip, you can push and pull the 24-inch-wide nylon head to catch leaves, dethatch and—when it's flipped over—smooth soil

Saves sweat
Weighing about a pound, this bamboo rake gets shape and strength from a polypropylene head

BY JOE CARTER PHOTOGRAPHS BY BENJAMIN OLIVER

RAKE RHAPSODY

WHAT DO YOU MEAN THIS ISN'T FUN?

THE SHOW STARTS WHEN THE LEAVES TURN. THEY GLOW AND flutter in the sharpening air, radiating the sense that this is surely the best of all seasons. Of course, as each leaf hits the ground, a gnawing anxiety builds about the chore that looms. Raking leaves is hard work, but the very act of uncovering pristine green beneath that riot of red and yellow is rewarding and satisfying. Like meditation, the steady repetition of pulling tines across turf frees the mind. And in the end, one little patch of the universe is back in order. If that doesn't leave you smiling, maybe you need better tools. This raker's dozen will fit nicely on the wall of your garage. ■

Keeps kids happy
A 9 inch wide, 35 inch long mini-rake is perfect for children. Get 'em to think raking is fun before they develop another attitude

Sweeps wide
Comb a broad swath with this 36 incher. The steel tines are replaceable

Holds its shape
A polypropylene band stabilizes steel tines so neither they nor the gardener gets bent out of shape

Cuts thatch
Roll through thatch with 11 sharp cutters. Wheels have three depth settings

Fits the hand
A T handle gives this 10-inch rake more pulling power for clearing garden beds

FOR MORE TOOLS, SEE DIRECTORY, PAGE 101

BY WILLIAM MARSANO ART BY SUSAN SAAS

NATURE ATTACKS
FIGHT BACK

WHEN FALLING LEAVES DRIFT past the window, wistful thoughts of summer still abound. But as the days grow long, you'll soon be hearing winter's song. Bullying winds and plummeting temperatures can catch you by surprise and batter your house. But if you prepare for sudden emergencies, you can keep them from becoming costly disasters.

A giant tree smashes through the roof and rain pours in, or an ice dam sends a small flood under the shingles and into the house. Minimizing water damage takes fast action with duct tape, staples and six-mil polyethylene sheeting. In an attic, the polyethylene can be spread across joists or tacked to rafters to collect the intruding water and send it back out through a soffit vent or window. Similarly, water invading living spaces can be let out doors and windows by tacking up poly sheeting to form a sloping trough that redirects the flow back outside.

A bad storm knocks out power, and with no way to heat the house, people have to evacuate. Subfreezing temperatures will destroy plumbing and heating lines unless you shut off the main water supply valve and open all faucets, hose bibs and other taps to break any vacuum that would stop pipes from draining. If there's an indoor water meter with an integral tap, drain that too.

Turn off the main circuit breaker or pull the main fuse so that when power is restored, nothing runs unattended. If the power may be out for several days, drain the water heater, the washing machine, the dishwasher and even the ice maker. But don't empty toilet, sink, tub and shower traps. That can open the way for poisonous and explosive methane sewer gas. Instead, pour in propylene glycol automobile antifreeze. Hot-water and steam heating systems should also be emptied, as should the humidifier in a forced-air system.

A blazing fireplace suddenly goes wild. Fed by a big rush of air, flames leap out of the chimney. The cause: excessive—and flammable—creosote deposits inside the flue. The result: temperatures approaching 2,000 degrees Fahrenheit, hot enough to melt metal flue liners, crack ceramic ones, weaken brick mortar and set the roof on fire.

To prevent this disaster, get your chimney swept regularly and keep a couple of fire suppressant sticks on hand. They look like road flares but emit a large volume of smoke that suffocates flames. After tossing one into a raging woodstove or fireplace, choke off the air supply by closing all inlets and glass doors. Then call the fire department and hightail it out of the house. ■

FOR BOUNCES, SEE DIRECTORY >PAGE 181

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Need a partner in pizazz? Team up with a decorator at The Home Depot. They can help you create a room like this easier and less expensive than you think.

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THE HOME DEPOT

Right at Home
For Decorating Ideas

Wide wingspan

Machined from solid brass and shrouded in chrome, this widespread faucet (its handles mount separately from the spout) features porcelain levers that can be installed up to 22 inches apart thanks to long rubber hoses sheathed in braided stainless steel.

SPLENDID SPIGOTS

Remember when a faucet was just a faucet?

Not many years ago, the faucet was the Plain Jane of the American bathroom, a utilitarian pair of valves that magically filled basins with the mere flick of a wrist. Turn the lever one way: running water. Turn it the other: water be gone. Today, the faucet is still a marvel of expediency, but it's not just a spigot anymore. Inside and out, faucets have evolved from the simple to the sublime. The mechanics of the modern faucet can be enough to perplex even a devoted handyman. With ceramic discs, washerless cartridges, rotating ball valves and more plastic parts than a new car, you might want to keep the plumber's phone number handy.

Such inner complexity is reflected in exterior design as well. More than 500 different versions of the device are now available. "In the 1950s, everything was ceramic white or chrome," says *This Old House* plumber Richard Trethewey. "Now faucets have become part of the fashion statement of a house." Expensive metals and high-tech plastics are turning bathroom faucets into complex expressions of design. Some levers look like intricate medical devices; others are sculpted into forms that seem worthy of gallery display. Spouts have become small fountains or long-necked, trumpetless swans. Flexible pipe is as common as solid. Metals wear coats of paint, Teflon, pewter, copper, plastic, brass, gold, nickel or silver.

Modern faucets are designed to "please the eye and gratify the soul," according to one manufacturer. Where once water ran straight and uninspired, now it's a deluge, a cascade, a waterfall of possibilities. And if none of that excess impresses you, have a peek at their price tags.

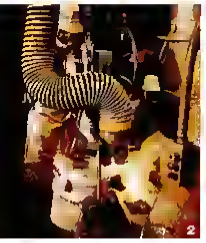
Brass needs a tarnish-stopping finish, so Chicago Faucets' Jose Sandoval gives racks of buffed spouts a dip in electrified vats of curry-colored chrome solution.

STILL-LIFES BY MICHAEL GRIMM LOCATIONS BY KOLIN SMITH

Making faucets in sand

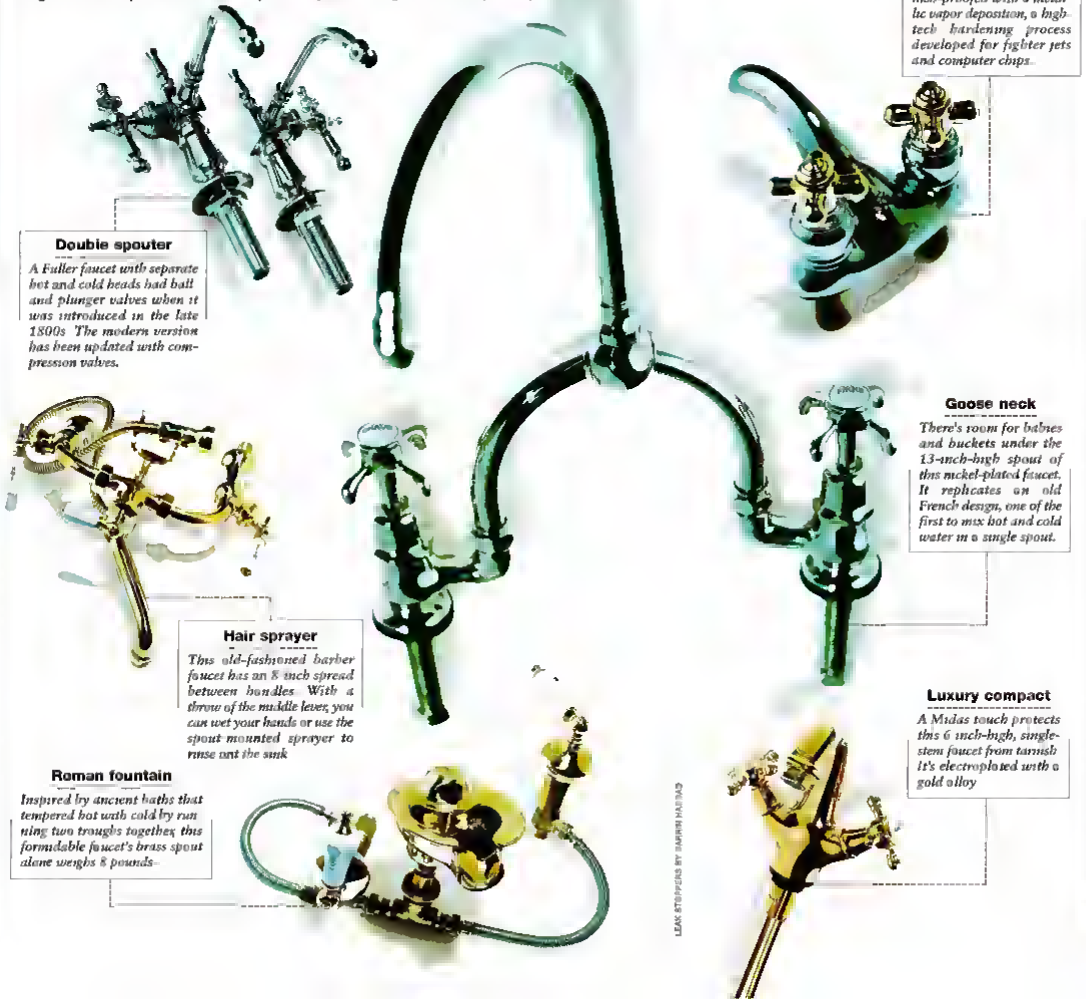
1. At the Chicago Faucets factory in Des Plaines, Illinois, the faucet-making process begins when George Castro takes a master pattern and imprints a mirror image of the fixture in damp black sand. Atop each gritty depression, he places a delicate core of fine-grained white silica, which will form the faucet's hollow waterways.

2. After Castro mates the two halves of the hard-packed mold, foundryman Jim Crowe slowly tips his crucible and pours a fiery stream of molten red brass—an alloy of copper, tin and zinc heated to 2,268 degrees. 3 Minutes later, when the brass cools enough to hold its shape, the mold is shaken loose and Jorge Tellez grinds and polishes the still-hot casting to remove any imperfections. Next comes machining, which threads the fixtures, followed by a 43-dip electroplating, which covers the casting with a nickel coating one-thousandth of an inch thick and a chrome topcoat one-millionth of an inch thick. The plated spout is then married to valves machined from yellow brass and fitted with stainless stems and rubber O-rings. The assembled faucet is ready for shipping.



BOLD AND BRASSY

You can buy a faucet in a blister pack on a pegboard, or you can embellish your bathroom with an elegant piece of plumbing decor. Both will fill a sink, but you must pay more for heft and eye-catching style. Hand casting and polishing, close-tolerance machining, exotic coatings and limited production runs can push the price of a high-end fixture past $1,000.



Double spouter

A Fuller faucet with separate hot and cold heads had ball and plunger valves when it was introduced in the late 1800s. The modern version has been updated with compression valves.

Hard body

The brass cross handles on this 4-inch center-set (its spout and handles mount on the same base) are furnish-proofed with a metallic vapor deposition, a high-tech hardening process developed for fighter jets and computer chips.

Goose neck

There's room for babies and buckets under the 13-inch-high spout of this nickel-plated faucet. It replicates an old French design, one of the first to mix hot and cold water in a single spout.

Hair sprayer

This old-fashioned barber faucet has an 8-inch spread between handles. With a throw of the middle lever, you can wet your hands or use the spout-mounted sprayer to rinse out the sink.

Roman fountain

Inspired by ancient baths that tempered hot with cold by running two troughs together, this formidable faucet's brass spout alone weighs 8 pounds.

Luxury compact

A Midas touch protects this 6-inch-high, single-stem faucet from tarnish. It's electroplated with a gold alloy.

LEAK STOPPERS BY DARRIN MATHIS

Leak Stoppers

Faucet valves are easy to take for granted, until they start leaking. Then the telltale drip, drip, drip turns their insides into objects of annoyed fascination.

There are four basic valve types: compression, ball, cartridge and disc. The old-fashioned compression valve works the same way the Little Dutch Boy's finger plugged a leaking dike: A soft material (a washer) is pressed firmly against a harder one (the valve seat) to keep water from seeping out. Constant wear and hard-water deposits eat away both washers and seats, fortunately, new ones are easily installed.

A ball valve, which controls temperature and flow with a single lever, has a perforated brass or plastic sphere that moves like a hip joint. The ball and its spring-loaded washers are susceptible to wear and may need frequent replacement.

A cartridge valve encases a pierced stainless cylinder in pierced plastic. Turning the handle (or lever) lines up the holes so the water flows. When it leaks, the entire one-piece assembly must be replaced.

Disc valves have a mated pair of perforated wafers so smooth no water can pass until the discs' holes align. Ceramic discs have conquered Europe, and *This Old House*'s Richard Trethewey predicts they'll be in most U.S. faucets soon. Beware of low-end valves with plastic discs—they wear quickly. And be aware that fixing ceramic is expensive. A new ceramic disc valve from Chicago Faucets is $12, a washer for its compression valve costs 31 cents. ■

From the outside, both valves look the same, but the left one turns a ceramic disc, while the one on the right compresses a rubber washer against a metal seat. Super-smooth white ceramic discs, below, made of aluminum oxide, promise long, leak-free service, old-fashioned washers are cheaper and easier to replace.

FOR SOURCES, SEE DIRECTORY, PAGE 193

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BY GARY BELSKY

MORTGAGE PRISON

Is getting out sooner really a good idea?

When Gaty and Mary Ann Ayets bought their three-bedroom condominium in Cheyenne, Wyoming, nine years ago, they planned to pay off their $63,000 mortgage as quickly as possible. "I didn't want to be making house payments when I was 70," recalls Gary, 56, who retired from the Army National Guard in 1992 and now works full time for the Laramie County Emergency Management Agency. The couple's battle plan: Take out a 15-year mortgage and, with luck and regular prepayments, wipe out their debt even faster than that. Their strategy seems to have paid off. "We'll own the house outright in a year," Gary says. "That's about five years ahead of schedule, which will be nice."

Nice—but is it smart? That's a question financial pros have increasingly come to debate. Over the last 10 years, booming stock market returns and relatively anemic real estate gains have changed traditional views of the investment value of a house. Today, deciding between a conventional and a short-term mortgage is more complicated than simply comparing payment schedules. "There's no easy answer," says Joseph Eamon Cummins, author of *Not One Dollar More! How to Save $3,000 to $30,000 Buying Your Next Home*. "In the end, it comes down to a number of factors, including your feelings about debt and, oddly enough, your views about the stock market."

To be sure, most buyers (about 85 percent) finance for the long term. They don't want the highet payments that are part and parcel of a short term mortgage, which typically runs 15 years but ranges from 10 to 20 years. Still, one version of the conventional wisdom has always held that the faster you pay down any loan, the better off you'll be. Lenders reward short-term borrowers with a lower interest rate—usually one quarter to one half percentage point below the rate on a 30 year loan—because the bank's money is at risk for less time. More important, total interest payments for short-term loans are much lower.

ILLUSTRATION BY VALERIE PIZZO

Consider these numbers, supplied by HSH Associates, a New Jersey mortgage tracking firm. A 30-year, $100,000 mortgage at 8.12 per cent (the recent national average) will rack up $167,173 in interest charges. With 360 monthly payments of $742, the loan will actually cost $267,120. Cutting the term in half and lowering the interest rate to 7.74 percent (the recent average for 15 year mortgages) raises the monthly payment to $940 but reduces interest costs 58 percent to $69,200. For a 10-year loan (7.34 percent, $1,178 a month), total interest payments plummet to $41,360.

For those who can make the payments, the arithmetic of the short-term mortgage would seem to make a convincing case for a faster payoff. But the advent of two related phenomena—the 14.7 percent annual return of the stock market over the past decade and the heightened investment IQ of the average American—weakens the argument. A growing number of financial pros and average investors have come to believe that short-term financing is a poor use of capital. "A fifteen-year mortgage makes little financial sense," says Sandy Mappa, a Glenview, Illinois, financial planner and author of *How to Become Mortgage Free!* "The thirty-year mortgage is usually the wisest choice."

The current conventional wisdom favoring long-term debt is that since home prices are expected to rise a meager one percentage point over the rate of inflation for the foreseeable future—and most mortgage interest is tax deductible—there are better places to invest extra money than in the higher payments of a short-term mortgage. To illustrate the point, Donald Kukla, a certified financial planner and public accountant in St. Louis, offers the following scenario. Imagine you and a friend are both buying a house. You each need to borrow $100,000 and can choose either a 30-year or a 15-year mortgage. You take the 15-year loan, which means that your payments are about $200 higher than your friend's, who opts for the 30 year term and invests his $200 in the stock market. Kukla bases his calculations on these assumptions: First, that your buddy's investment returns will match the historical performance of stocks, or 10 percent a year; second, that those gains are fully taxable every year; third, that both homes increase or decrease in value equally; and fourth, that you took the savings from your mortgage interest deduction (assuming a 28 percent tax bracket) and invested it in the stock market as well.

At the end of 15 years, you're debt-free and have a nest egg of $39,921. Your friend, meanwhile, still owes $77,098 on his mortgage, but his investment portfolio has grown to $121,469, leaving him with a net gain of $44,371, or roughly $5,000 more than you. At the end of 30 years, he's debt-free too, but he has a pot of stocks worth $453,442, compared with $422,401 for you. Says Kukla, "From a dollars and sense point of view, the thirty-year mortgage is the best option for most consumers."

But before you lock into a 30-year debtor's prison and invest your money elsewhere, keep in mind that there's no guarantee stocks will perform in the future as they have in the past. Moreover, you need discipline to invest that extra $200 in the stock market every month, and the good sense or good fortune to make the right choices. After all, in Kukla's scenario the difference between you and your friend after three decades is only about $31,000, a meager 7 percent. If you're not sure you can invest conscientiously and well, you're better off with the guaranteed return of a faster payoff. "Paying off an eight percent mortgage faster is the equivalent of earning a guaranteed eight percent return before tax," says Beth Kobliner, author of *Get a Financial Life*. "For many investors, that's a rate that can be hard to beat."

Outside of the numbers, there's another less calculable benefit in borrowing for the short term: the psychic income you'll generate by unloading your biggest debt. "Many people are driven to be debtless," says Peter Wissinger, managing director of retail business for Norwest Mortgage, the nation's largest home-loan originator. "It's hard to put a price tag on that."

But not impossible. Carlos and Barbara Diaz have 15-year mortgages on their primary residence in suburban Seattle, and their vacation home up in Glacier, Washington. "My husband has a high-pressure job," explains Barbara, 43. "We want both our homes paid off before he retires, which may be sooner than later. The peace of mind that brings is invaluable." ■

Time off for good behavior

What if you decide that a short-term mortgage is best, but you're unsure about making the higher payments month in and month out? Consider taking out a 30-year loan and prepaying the difference between your actual monthly payment and the amount that a 15-year loan would have cost. That's the strategy Dave and Susan Tucker chose this past summer when they moved to Ames, Iowa. The thirtysomething couple were entranced by the thought of owning their home outright before they turned 50 but intimidated by the $1,250 monthly payments on a 15-year, $134,000 mortgage, compared with the $1,006 they would pay on a 30-year note. The Tuckers decided to take the 30-year term but pay at the 15-year rate. "This way we have the flexibility to use that extra money for emergencies as they arise," says Dave, 33, a software engineer. Because their 30-year mortgage carries a slightly higher interest rate, it will take the Tuckers a little more than 16 years to pay off their loan. If you're hell-bent on finishing in 15 years flat, simply ask your mortgage lender to calculate the necessary monthly payment. And before you commit, make sure there's no prepayment penalty hidden in the fine print of your contract.

(FOR SOURCES, SEE DIRECTORY, PAGE 61)

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Blueprints for Success:

Part I of a II Part Series

Women Architects on the Rise

Proportion, contour, light, space. The professionals who make these elements the tools of their trade play a significant role in defining the landscape of our world. In the field of architecture, women are increasing their numbers and influence, making their mark on the built environment.

Here we celebrate women whose passion infuses their work, resulting in structures that allow us to flow through our diverse roles with ease.

Sylvia Kwan
Kwan Henmi architecture/planning, inc
San Francisco, CA
National Board, American Institute of Architects

on career: "Our firm does everything from residential to commercial to civic projects. We believe in contextual architecture—our design needs to fit the community rather than our ego."

on design: "Space needs to be flexible today. Luxury and comfort are also important. We're seeing a demand for rooms like home theaters and wine cellars."

on balance: "I have two young sons, my own firm with 30 employees. I'm on the Board of AIA and the San Francisco Chamber of Commerce. I feel guilty all of the time, like most moms, but my sons and I have a contract. Each month I print out our schedule—what games I'll make, what practices I'll do the carpool for—and these are all unbreakable dates. It gives us all a sense of what to expect so we're not disappointed."

Gail Lindsey
Design Harmony Inc, Raleigh, NC
Chair, American Institute of Architects Committee on the Environment

on career: "We create structures that provide people with healthy environmental alternatives. Our projects include the national headquarters for The Body Shop and the greening of the White House and the Pentagon buildings."

on design: "We create spaces that give their inhabitants energy and enjoyment. We work with the earth's natural elements—the sun, the air—to co-create with nature."

on balance: "I make my choices based on what gives me energy and what takes it away. This has been the driving force behind my design and I also apply this philosophy to my life."

Alexandra Hayes
Alexandra Hayes Architect, Tucson, AZ
Member, American Institute of Architects

on women in architecture: "My work is primarily in residential design. As women, I feel we have insight into the flow and function of the many tasks that occur simultaneously in a home. I enjoy designing to save a client steps and time."

on design: "I see a trend back to the homestead where a client has a remote site for their new home and they do not intend to leave for extended periods of time."

on balance: "My husband and I are planning a family and have very active careers. I am now looking for the same flexibility that I offer to my clients. I have designed an addition that will give us a master suite with an office. The existing bedrooms will be used for a nanny and a nursery."

We'd like to thank these women for sharing their blueprints for success. Whether it's a home that gives us a sense of welcome and warmth, or an office that offers safety and security, the spaces they create make life easier and more comfortable. To identify a registered architect in your area, contact The American Institute of Architects, 1-800-AIA-9930.

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BY DENNIS WEDLICK

THE FORGOTTEN STAIRCASE

Remaking the centerpiece of your house

PHOTOGRAPH BY MICHAEL FREDERICK

A window on a landing turns a boring trip up or down stairs into a small event by offering a peep at the world along the way.

Going up and down a staircase should be an event. Something should happen to make that small journey fun and interesting. Yet very few homes take advantage of this idea. Think, for example, how you might transform your house simply by installing an unusual window at a landing or building a nice overlook at the top of the staircase from which you could peer down in a Juliet-like pose.

If your staircase doesn't bring out the best in anyone, it was probably an afterthought given no more attention than a closet. And the spaces it leads to are likely underused because all you have to look forward to is going upstairs to a dark, narrow hallway.

When remodeling, people tend to think a staircase is one of those parts of a house that can't be touched. To the contrary, a staircase is more easily altered or moved than most homeowners suspect. But any changes require a lot of thought first. Architects have a chant about the most challenging spaces to design—"stairs, chairs and public squares." And stairs are the most difficult of the three. Architects who've managed to succeed where others have failed garnered fame based partly on their stairs. Michelangelo's brilliant staircase in the Laurentian library in Florence helped secure his reputation.

Before moving a staircase, consider what can

When designing against an outside wall, as in this New York apartment project completed last year, Wedlick enlarges the windows, then tries to make the staircase disappear. Light pours in relatively unobstructed.

be done to open up the space it has been crammed into. In a typical center-hall Colonial or Cape Cod, for example, a confined staircase is usually the first thing one faces upon opening the front door. Simply knocking down the wall that separates the stairs from the adjacent living room or dining room will make the staircase part of that space, and it may even take on the sense of furniture. People ascending and descending the stairs will bring activity into the room. Imagine the scene of a young woman coming down the stairs to meet her prom date if the staircase is suddenly opened to the room where he awaits. Knocking down that intervening wall also increases the room's party potential. Guests will gladly use the stairs as spillover seating. Not only will the staircase seem bigger and more open, the room it empties into will appear larger too.

Relocating a staircase can create even more drama. I like to take a staircase from the center of the house and move it to an outside wall in front of existing windows. That allows more interior space to be used, because a staircase in the middle of a house is usually a barrier to traffic. If the new staircase is open on both sides, with skinny spindles holding up the rail, light from the windows will spill into the room. Looking at the staircase, one sees through the spindles and beyond to the outside. The staircase seems to disappear.

A well-lighted staircase makes a house bright from the core. Indeed, there can't be too much natural light. More windows can be added to the outside wall, or a window effect can be created anywhere along the staircase. For example, an interior window could be placed to borrow light from a bedroom at the top of the stairs. Kids love it, and it makes a cheap laundry chute.

A round window works well right at the base of a landing, about six inches above the floor. It sits at eye height for anyone starting up the stairs and makes a good little peephole. Every time

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you ascend, the experience becomes fun.

The area at the top of the staircase, the final landing, should be as spacious as possible, like a great hall. Most people end up in poorly lighted, narrow hallways at the top of the stairs—a cheap-hotel effect. No one feels much like hanging out there. Making the top landing a larger area may mean losing a few square feet from adjacent bedrooms, but those rooms will feel larger and more comfortable with doors open to a larger hall.

Down at the bottom of the staircase, people often ask for too much space and grandeur. Increasingly, heat clients say they imagine opening the door to their house and seeing a huge staircase that might as well be in the mansion of a Southern plantation. An oversize staircase that leads up to a dark hall won't make a home feel larger. Although people imagine that such a staircase will be impressive, to me it's anticlimactic. After you see such a grand staircase, everything else will disappoint. All the rooms may seem too small in comparison. The best thing about good design is that it offers the opportunity to control how people move through and perceive space. If you can slowly lead guests to increasing drama, they'll be all the more impressed when they get there.

A simple prefabricated steel spiral can take on a dramatic effect if set into a curved niche. For safety, treads must be wide enough to allow two feet to be placed on a step at the same time.

One warning before building the staircase of your dreams! Check local building codes. In some areas, if an existing staircase is replaced, codes require a new one that has much deeper treads and shorter risers for safety and comfort. That can make the new staircase a lot larger.

Whether you decide to open up a staircase or relocate it, the money will be well spent. In this era of master baths bigger than most bedrooms and Euro-kitchens that cost as much as small yachts, it makes sense to readjust a remodeling budget to address the forgotten stairway. When moving up and down the levels of a house is fun and inviting, when the core of the house is filled with light and space, when there is room to get on and off a staircase with grace and ease, you may wonder why you didn't make this change years ago. ■

WEDLICK'S RULES OF STAIR DESIGN

Architect Dennis Wedlick has experimented with stair designs for years. From his experiences, he offers these lessons:

1. **For most homes, simple, elegant components are best: skinny tapered spindles with square stock at the bottom, uncomplicated newel posts, plain wood rails.**
2. **Consider spacing spindles rhythmically: three close together, then a wide space, then a single spindle, then another space, then three close together again. Or play with two different types of spindles within the balustrade.**
3. **Try painting risers or treads to match or contrast with spindles and rails. Use porch paint for durability.**
4. **If new stair treads don't match your old floors, stain them a darker color. Mahogany stain on oak is beautiful.**
5. **Carpeting can make stairs more difficult to negotiate because it increases the diameter of the tread nosing.**
6. **Spiral staircases may not be as dangerous as they appear. They force people to stop and think before starting up or down.**
7. **When moving a staircase to an exterior wall in a house with a basement, framing methods dictate that upstairs staircases will be much wider than basement stairs because basement walls are thicker than those on upper floors.**

PHOTOGRAPH BY ANTOINE BOOTZ

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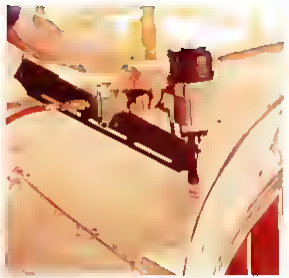

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LETTER *from This Old House*

THE SILVA STANDARD

Tom Silva takes off his welding mask and plucks the combination cellular phone, paget and two-way radio from the holster on his belt. "Go ahead," he barks. "It's Charlie," he predicts, winking at me. "He's looking for his paycheck." Sure enough, Tom's nephew asks where the payroll is. "Gee, I'll have to get back to you on that," Tom teases, then returns to arc-welding a hanger for a laminated steel and wood beam in the barn of the Milton dream house.

Tom's brother Johnny drives up with their father, Phil, who started R. E. Silva & Sons back in 1963. Phil still visits the jobsite, just to make sure the boys are on track. Johnny struts over to deliver jokes and well-rehearsed insults, singling out director Russ Morash for special treatment. "Great, isn't it?" says Russ, who has known the Silvas since they were kids growing up next door. "I need a good shot of insult from time to time." In past years Johnny would have cajoled us into ordering one of his homegrown turkeys for Thanksgiving. The price was high, but the cost in insults for declining was even higher. Now he's out of the turkey business and into show horses, so we rib him about his gold rings and shiny Western boots. He returns a few shots, unloads a stack of 2x6s from the truck and drives off.

From the barn comes the moan of a worm-drive circular saw and the machine-gun rattle of an electric impact wrench. Phil Jones and Bob Towel are assembling a big timber truss to shore up the roof. Elsewhere on the site, Herb Brockert is excavating for the foundation of the new kitchen, electrician Allan Gallant is planning the shop wiring, and Tony from Trethewey Brothers has come to assess the plumbing. Somehow Tom manages to answer questions from each and still finish welding the bracket.

Besides this project, there are five Silva Brothers jobs scattered across greater Boston. The guys float from job to job as needed, but command central is always Tom and his digital communicator. The unit chirps again. This time it's brother Dick with a question. Tom balances his bifocals on the end of his nose, punches up the information on his electronic organizer and, with a sly grin, tells Dick to stop wasting time and get back to work. To be part of this crowd, you need thick skin and a tough ego, not to mention the tools, the skill and the motivation to get the job done. And done on time—Tom will see to that. I, for one, am pleased to watch again the extra ordinary skill and professionalism the Silvas bring to our projects. With them, even the insults are special. —Steve Thomas

PHOTOGRAPH BY CHRIS BUCK

From left, Silvas Charlie, Dick, Tom and John

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LOOKING FOR TROUBLE

Norm, Steve, Tom and Richard search the fall TV project house for rotten beams, rusty pipes, frayed wiring, leaky shingles and hidden horrors homeowners dread

"If I were in the market, this is a house I would definitely consider," says Tom Silva, impressed by the relatively plumb and level lines of the Colonial's facade. "But if you don't believe a house this old needs work, you're living in a dream world."

The rotted bottom of a corner board on an addition built in the 1880s yields easily to Tom's screwdriver. The culprit: downspout splash. Tom says such spouts "should connect to solid pipes or troughs that carry the water away from the house."

"ISN'T THAT SPECIAL?" mutters Tom Silva, crouched behind the *This Old House* dream house in Milton, Massachusetts. The object of his sarcastic observation, a piece of 12-inch aluminum flashing leaning out from the foundation.

These thin metal strips can be a building's salvation, channeling water away from vulnerable seams. But Tom says this piece, intended to separate a brick patio from the house's rear wall, was installed "exactly backward," forming a trough that holds rainwater against the house. "It's like a gutter designed to keep the bottom of the wall wet and rot it quickly. That's a new one on me," he sighs.

Such moments of dismal revelation are part of every house inspection. The crucial question: How many unwelcome surprises will *This Old House*'s crew of contractor Tom Silva, Steve Thomas, Norm Abram, plumbing and heating specialist Richard Trethewey and other experts encounter as they sight, poke, thump, sniff, measure, scrape and, occa-

BY BRAD LEMLEY PHOTOGRAPHS BY KELLER & KELLER

sionally, caress this 3,200 square foot home, its adjacent barn and the 2.9 acres on which they sit?

The men always take inspections seriously, but in this case, they have more incentive to be vigilant. In a departure from the show's tradition of working with homeowners, WGBH, the Boston public television station that produces the program, bought the pre-Revolutionary Colonial in Milton outright. The guys will fix it up and sell it on the open market—and they can't fix what's wrong until they identify it.

That water kills wood-frame houses is a dictum both Tom and Norm have recited for decades. So for most of this tour, Tom will think like a raindrop. He'll imagine himself smacking into the shingles, clapboards or earth around the house, then pouring, oozing, splashing, dribbling, percolating, evaporating or condensing as dictated by architecture, gravity, wind and temperature.

Tom begins this inspection as he always does, with the long view. Strolling around to the sun washed front yard, he stands 50 feet back from the facade so he can see the whole structure, including telltale droops. "This is a post-and-beam," he says, referring to a construction style, common until the early 1800s, that uses massive, widely spaced timbers to hold up a building. "Even from the outside, you can see the old beams and how the roof has sagged between them." He scallops a finger in the air to mimic the gentle seven-foot-wide dips that run from peak to eave. "Wood sags as it gets older, just as we do."

The kitchen, penetrated by four doors, is "all circulation," grouses Steve Thomas. It sits on the house's dark side and suffers from an early 1960s decor he terms "Colonial whoop-de-do."

If the whole building were sagging or leaning, that might mean a sill, the beam that sits right on the foundation, was badly rotted. But that hasn't happened here. "Overall, things are as straight and square as you can expect in a house this old," Tom says.

His eyes and hands inch down the facade. "I see that it has a fresh paint job. That can mean major problems have been covered up, but it's also a common thing to do before selling, so it may not be important." Framing the double-hung window to the door's right with his thumbs and forefingers, he notes, "There's already some serious peeling around that window. That could mean a wet basement and no vapor barrier, so moisture in the house is pushing the paint out."

Tom's gaze lingers at the fieldstone foundation. A home's connection to the earth is critical. Serious problems often start here, and, given that tons of house sit atop them, can be brutally expensive to fix. "You look at the elevation of wood to ground," he says. "It should be at least eight inches." Otherwise, splashing rain and drifting snow can rot sills. Strolling around the house, Tom finds that standard isn't generally met. In fact, in the rear, dirt covers the first course of clapboards. When he pushes the soil away with his foot and gives the bottom clap a swift kick, it emits a punky tock, like a thumped overripe melon. "Sound can tell you a lot. That doesn't sound too solid."

Craning his neck to inspect the rear walls and roof, Tom discovers more moisture. "There's a little weed garden growing in one corner of the gutter, and the gutters are blackened, so water has been running over them. I also see there's no soffit ventilation anywhere." A massive, artless glob of tar around a vent pipe coming up from the kitchen means "it most likely was leaking."

The ravages of water's patient, relentless assault grow even clearer as Tom trudges down the worn wooden steps to the cellar. The odor of mildew assaults the nose, the whitewashed fieldstone sports dense patches of mold, and silted puddles dot the brick floor. "A lot of these sills are in rough shape," he says, prying spongy fibers from one. The subfloor is also decaying, particularly a section just above the old furnace. "We'll have to tear that out and replace it."

The joists, 2x10s that support the floor above, aren't original. Tom can tell because they sit beside the sill's chopped out pockets, not in them. Most of the joists rest on a hodgepodge of beams installed in the early 1950s. Those in turn are supported by concrete-filled steel columns known as Lallies, which tell their own woeful tale. "Look at the base of this one," Tom says, peeling off a palm-size flake of ochet rust. "They sank it directly into, instead of on top of, the concrete. That's not smart. Water collects and eats away the steel, so you have only the concrete in the column holding it together." He judges the Lallies strong enough to remain, but he'll discuss replacement with other crew members.

During their basement tour, Richard Trethewey advises Tom that the old boiler should be junked. "This is a tankless boiler that stays hot even in summer," Richard says. "It heats a large mass of water all the time to get a small amount of hot potable water now and then."

Moisture has eaten into more than just the house's structure. Joining Tom down in the cellar, Richard Trethewey gazes skeptically at the webwork of supply, drainage and boiler pipes. "These are what we call wet returns," he says, pointing at several badly corroded galvanized steel pipes that traverse the moist floor. "These carry the water that condenses in steam radiators back to the boiler. When they look this bad, they're like corroded arteries. You barely touch one, and it breaks."

The only part of the plumbing system that impresses Richard is the bread-box-size controller for the two solar hot water panels perched on the roof of the addition. "This is a Grumman, a great brand name in the late '70s. Used to be, solar hot water required a complicated collection of valves and other stuff, but Grumman came up with this controller package that just hung right on the wall." A gauge on the unit reports that now, at 11:30 a.m., the water temperature is 105 degrees. "It's still working great in 1997—that's a real tribute to it."

Still, "all of this will go away," he says, sweeping a hand to indicate the entire heating and plumbing system. His crew will rip out the furnace because it's inefficient and extract the solar hot water system because the rooftop panels, while environmentally noble, look out of place on this old Colonial.

Another basement visitor, master electrician Al Gallant, finds the wiring as pitiable as Richard did the plumbing. Most is armored cable known as BX, popular in the 1940s but subject to corrosion, espe-

Norm Abram plucks off a chunk of rotted floor beam in the barn. The beam terminates at a post, which received a quick repair, probably in the mid-1980s. Someone sawed off the decayed bottom and inserted four sandwiched 2x8s. "We'll replace the whole post," Norm promises.

cially at junction boxes. Knob and tube wiring, dating back perhaps to the 1920s, services most of the second floor. Gallant says decades of overloading made it overheat, embrittling its fabric insulation.

Ironically, the 100 amp breaker panel, added in 1983, is in even worse shape than the old wiring that leads to it. "The original installer didn't seal the meter socket properly. Water dripped directly from it right into the panel." Though the panel should have lasted 30 years, it's ruined—and a serious hazard. With all the breakers corroded, it won't trip predictably if overloaded. And, like most old houses, this one is underwired, Gallant says, with just two outlets in most rooms.

When the inspection moves up to the living areas, Steve Thomas joins in, pointing out charming historic flourishes he hopes will remain untouched. Among his favorites: whole-wall raised-panel pine, known as breastwork, that imbues the upstairs master bedroom and the parlor below with honey-colored warmth, gorgeous wide-pine floors that "I wouldn't even sand—you'd lose that wonderful patina of age", and an eclectic collection of fireplaces ranging from shallow Rumford style one room heaters to a vast-throated beehive hearth in the central downstairs room.

These appealing touches are confined mostly to the original building, and the team plans virtually no changes here aside from cosmetic tinkering. But the kitchen, subject of a 1962 remodel, suffers from aqua countertops, pseudo-Colonial cabinetry and fake ceiling beams, and it broods in the perpetual shade of the home's north corner. "Aside from aesthetic problems, it's on the wrong side of the house," Steve says. "Nuke it."

The kitchen will migrate to the southeast side. The old kitchen will become a full-featured media room, the relative darkness and quiet of this corner of the house augmenting the latest pay-per-view offering.

Creaking stairs lead Tom and Steve from the second floor to the attic. The spare, dim garret features one ragged bedroom, which was created by simply sawing out one of the horizontal braces, known as collar ties, that keep the roof from spreading. Luckily, the old bones survived this insult with no apparent damage. An inadequate four-inch layer of dusty rock-wool insulation lies beneath the attic floorboards, and mildew blooming on the roof sheathing indicates stagnant air. Tom says the single gable vent is not enough and at least one more opening will be needed to create cross ventilation. Continuous venting along the soffit would help air circulation even more.

At the end of the house tour, resting against an old cable spool in the yard, Tom is upbeat, despite all the skew, rot and sag he's uncovered. "As houses this old go, the structure here is somewhat better than average. The former owners made some effort to keep up with problems as they arose, like adding the new joists and beams in the basement ceiling. There are definitely problems, but nothing beyond what you would expect."

For his part, Steve sees more possibilities than problems. "This house is almost identical to my own house. It's got a great mix of formal space in the front rooms, leading to the casual kitchen we plan to build, and the family can get together and watch dinosaurs rampage in the media room. The master bedroom upstairs overlooks the wonderful meadow, and you can store your barrels of claret in the cellar." He grins, captivated by the vision. "Oh, yeah. I can easily see myself here."

The intersection of barn and ell, top, creates the perfect protected spot for a vegetable garden. But the ell itself is structurally shot, so after salvaging its graceful arched window, below, workers will erect a new building to house a handyman's dream workshop designed by Norm.

FUTURIST FAITH POPCORN COINED THE term cocooning to describe the trend of urbanites—afflicted by traffic, crime and free-floating boomer angst—settling into self-contained oases. The red-shingled, circa-1850 barn, less than 100 yards southeast of the house and just two miles from Boston's city limits, epitomizes this have-it-all dream. Tom's crew will build a modern exercise room and sauna on one side and reserve part of the other side for garage space. The rest of the 40 by 60-foot ground floor and the huge loft above will remain open.

Landscape architect Tom Wirth and Steve admire a gently sloping meadow that Wirth wants to preserve. Behind them, the old conservatory will give way to a smaller screened porch.

On the whole, the big old barn is in "relatively good condition," Norm reports. "The main reason is that the roof has remained pretty tight." But trouble spots, springing from the bottom up, aren't hard to find. The piled-rock foundation holds the structure just a foot or so above a dirt floored crawl space. One hundred and twenty years of trapped, rising damp has rot riddled the bottoms of many of the 8x8 posts.

Luckily, the most recent owners, Donald and Virginia Devine, took action in the mid-1980s. Workers sawed off the decayed bottom of the northeast wall and replaced it with an elevated concrete foundation. "We were really encouraged when we saw that repair," Norm says. "It meant someone was watching out for the place."

Other repairs were less successful. Also in the mid '80s, the Devines had the original, rotted floor replaced with pressure-treated joists topped with untreated ¾-inch plywood and spruce planks. Back then they parked their cars on it, but now the plywood is starting to delaminate as it sucks moisture from the damp ground. Tom's workers will dismantle this floor, hold on to the still-useful pressure-treated joists and pour a concrete slab—a fireproof, cheaper alternative to wood.

"Check this out," Norm says, squatting by a post near the garage doors. Because it was rotting, "somebody just cut the bottom off." Testifying to the integrity of the old structure, the post, levitating a foot above the foundation, led to no noticeable sag.

But other dips and bends are easy to find. "Tommy got out his laser level and shot along this beam," Norm says, indicating a floor timber near the barn's center. From one end to the other, "it drops three inches." Suddenly, to Norm's surprise, the beam sinks as one of Tom's workmen steps on it. "Wow—lost another inch right there."

Fortunately, repairing this old barn will be a blessedly unfussy task compared with revamping the house. "The idea isn't to make it gorgeous, it's to stabilize the structure," Norm says. "Even if I owned it, that would be where I'd put my effort. I'm confident we can do that without too much pain."

The only part of the barn that's beyond salvation is the rotted,

leaking, swaybacked ell that projects off to one side. As the first official act of renovation, the Silva Brothers crew will tip it down and on its footprint build a new wing that will house a Norm-designed, state of the-art woodworking shop.

The synergy of vast, glorious space and snazzy tools has Steve salivating. "I'm intensely jealous," he moans. "At my place, all I have is a tiny, squalid garage."

LANDSCAPE ARCHITECT TOM WERTH strolls down the gentle slope of the south meadow, his feet swishing through the remains of a flower garden. "We've got daffodils, wild mustard, irises, a lot of naturalized bulb plantings," he says. "And all around you can see old historic bushes—hollies, lilacs and so on. They were planted in the Victorian period and have gone past their maturity."

The result, to the untrained eye, is a landscape gone to seed, almost totally without structure. But Wirth not only discerns a man-made pattern, he likes it and will preserve as much as he can.

"There's a lovely conifer edge around the whole property, and it has some wonderful specimen trees that were obviously planted. Traditionally, these old farmhouses have trees planted as mementos to relatives or friends. So," he says, spreading his arms wide to embrace the gently south-sloping land, "you get this lovely sense of containment around this big open space that combines yard and meadow."

Wirth says he'll stick with the enclosed meadow theme but spruce up the details. The existing driveways don't work. One leads to a small parking lot on the house's west side; the other is a straight shot to the barn. Neither is within 50 feet of the new kitchen, so hauling in groceries would be a trek. Old photos show a grand, curving lane swooping right by the facade—stare hard at the front yard and you can just make out a vestigial crease of the original track. Wirth says he may bring the driveway back.

And the ring of hemlock, spruce and pine, originally meant to muffle traffic noise from a nearby busy interchange, has outgrown that role. "The trees are mature now, so at ground level, there's almost no foliage. It's no longer an effective sound barrier. We're probably going to need a fence to do the job now."

Plans aren't drawn yet, but Wirth hopes to create a mix of shade and ornamental gardens that literally pull the new owners into the landscape. He'll also site a vegetable garden in the protected plot between the old barn and the new ell—a nod to this old farm's agrarian roots. He may put a terrace just outside the new screened porch on the house's southeast side, a perfect spot for formal outdoor entertaining. But mostly, he'll aim to create a more casual division between indoors and out—the sort of constant, pleasant interplay between home, barn and property that earlier residents enjoyed as they worked the land.

"This was first a working farm, then a gentleman's farm and only recently a suburban home. Everything we're doing is inspired by the property's history." ■

Real estate appraiser Fred Bucklin says the primary appeal of the project house is that "it's got a rural feel, but it's ten miles from downtown Boston." The potential buyer, he adds, is "probably in the high-tech industry. Those are the ones pulling down big salaries at the moment."

PHOTOGRAPHS THIS SPREAD BY SIMON WATSON

THE BOTTOM LINE

The purchase price for the tumbling Colonial at 1144 Brush Hill Road was $415,000, and revamping it will cost $300,000. Simple math: The renovated property must fetch at least $715,000 for the project to end up in the black. "Suddenly we're in the same position as other homeowners," says producer Bruce Irving. "If we lose money, I'll be very unhappy."

Fred Bucklin says he can help *This Old House* lower the risk. An appraiser for more than 20 years, Bucklin has set values on thousands of properties ranging from homes to shopping centers, golf courses, even cranberry bogs. He often calculates the potential payback of planned residential renovations. "Almost always, the appraisal pays for itself by showing you which features buyers want most and which ones you should probably avoid putting in. That's how we stay in business."

1880 Carriage House – $645,000

1821 Colonial – $522,000

Bucklin starts by analyzing the property's town. Milton, he says, is graced by dozens of large estates, including our project house, on prestigious Brush Hill Road. Four nearby properties on this street were on the market in early summer for an average of $1.1 million. But Milton has plenty of smaller, cheaper homes; the median price for all properties sold in the first quarter of this year was $182,500. That's far lower than tonier Boston bedroom communities such as Dover (median price $725,000), Brookline ($459,000) or Lexington ($410,000). "The price the guys are aiming for is definitely at the upper end of the bracket for Milton as a whole," Bucklin says.

Turning specifically to our dream house, Bucklin spent a week analyzing recent sales of compatable homes to determine how much buyers are willing to pay for the kind of improvements the team plans to make. A converted 1880 carriage house went for $645,000. A tidy 1821 Colonial with a similar shape and room count to the project house but fewer amenities garnered $522,500. Squeezed onto a narrow lot, an 1840 Colonial sold for $412,000 and is now undergoing an extensive rehab. In an 82-page report, Bucklin estimated that the value of the project house, once renovation is complete, would be $730,000. In other words, the project would likely break even and perhaps turn a small profit. "The important factor to me was that there are several properties for sale in the immediate neighborhood in the price range of $665,000 to $1,650,000. That indicates there's good demand on Brush Hill Road in the upper price range," Bucklin says. Further, in that lofty range, the dream house will be among the less expensive houses, "which makes it even more desirable."

But don't try this at home. Norm Abram, Tom Silva and the rest of the crew have some unique advantages that typical on-spec renovators don't. Irving estimates he'll collect about $250,000 in donations from manufacturers eager to have their products used in the house. So while WGBH, *This Old House*'s parent TV station in Boston, will spend $300,000 out of pocket on the renovation, donated goods such as the workshop's tools, the media room's electronic gadgetry and the exercise room's equipment mean the same renovation by a different contractor would cost $550,000. That would raise the break-even selling price to $965,000.

And the job will unfold before millions of television viewers and magazine readers. "That's a huge advantage over a multiple-listing mention," Bucklin says. He concedes that the effect of this unique factor on the selling price is impossible to calculate, "but exposure like that can't hurt."

1840 Colonial – $412,000

FOR SOURCES, SEE DIRECTORY, PAGE 161

The hilly, river-cut countryside of northeast Iowa is picture-perfect as the headquarters of Seed Savers Exchange. The organization is dedicated to preserving the most important aspect of this nation's agricultural heritage: its seeds.
FAR RIGHT: Seeds of tomatoes shaped like pears, grapes, sausages and baseballs ferment at the organization's 173-acre Heritage Farm

SAVE THE SEEDS

How a grandfather's legacy kept five-color chard and hundreds of other rare plants from certa[illegible]xtinctio[illegible]

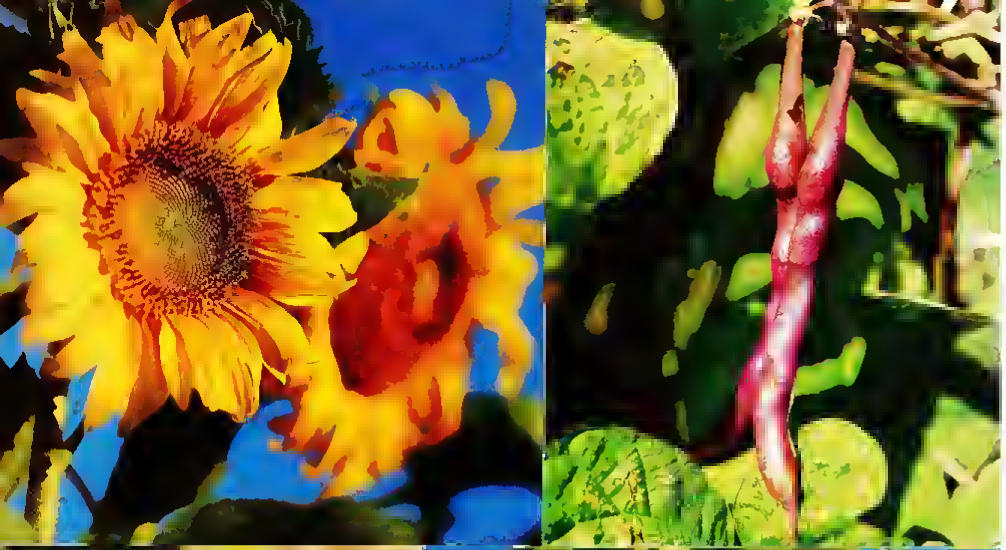
BY JACK McCLINTOCK PHOTOGRAPHS BY KELLER[illegible]

When Diane Whealy was a little girl, she loved to follow her grandfather up and down the rows of his garden, listening to family stories and watching the vegetables grow. So it was natural that, when he was dying in 1972, Grandpa Ott entrusted to Diane and her husband, Kent, a precious family heirloom: his favorite garden seeds.

Both Diane and Kent had grown up in Midwestern gardening families, and when they married, they became back-to-the-land enthusiasts. They built a house in a Missouri woods and grew their own food and a crop of strawberries for cash. The gift of seeds thrilled them. Here was a chance to preserve part of their horticultural heritage.

Fueled by Diane's sense of history and Kent's concern about the dangers of genetic erosion, they planted Grandpa Ott's pink Bavarian tomato, prolific pole bean and vigorous, deep-purple morning glory. Before long, the Whealys had launched a crusade on behalf of America's threatened heirloom seeds. Today, their Seed Savers Exchange has grown into a nonprofit network of 8,000 gardeners in 30 countries who have preserved 12,000 rare vegetables, fruits and flowers. They include descendants of seeds brought over on the Mayflower, seeds grown in Jefferson's gardens at Monticello and seeds carried along the infamous Trail of Tears in the 1830s.

For centuries, immigrants



LEFT: Preserving the world's horticultural oddities, Seed Savers Exchange last year grew 150 varieties of sunflower, with seed heads ranging from an inch to a foot across. The purple European bean was rediscovered in an Ozark garden in the 1930s. The apple, known as Robin, had its origin in France, and the five-color silverbeet chard is from Australia.

brought their favorite seeds to America: cabbage from Germany, rye from Russia, tomatoes from Italy, eggplants and melons from Asia. Handed down by farm families like the Otts and preserved in ethnic enclaves and by small seed companies, they enriched the diversity of the nation's crops—and its cuisine. But as vigorous hybrids grew more popular, heirloom seeds got squeezed out of the market. Large agricultural conglomerates bought up small seed companies, "and if they can't sell 500 packets a year, it doesn't pay," Kent Whealy says. "This incredible heritage that is the end result of ten thousand years of natural and human selection could die in a decade because of short-term commercial factors. And when it's gone, it's gone. Future generations will never enjoy these varieties, and invaluable genetic characteristics are lost forever."

Genetic variety has practical value. Growing more types of potato might have prevented the devastating Irish famine, in which a blight killed the entire single-variety crop. Early American farmers in cold climates grew Orchard Baby corn, which produces ears less than five inches long but matures in only 60 days, a trait that may someday make corn a more successful crop in many gardens. More recently, Vietnamese immigrants brought a frost-resistant eggplant to California. For now, commercial eggplant growers produce their crops in warm places, so seed companies have little incentive to invest in developing a frost-resistant variety. But genes from the hard, bitter fruit—which older Vietnamese men traditionally eat to assure virility—might someday lead to a cold hardy version of the closely related tomato.

The Whealys began their crusade modestly. In 1975, they wrote a letter to several magazines, urging like-minded gardeners to save and swap seeds. The letter brought six responses, and the writers became Seed Savers' first members. One was Lina Sisco, who offered the seeds of a bean her grandparents had lovingly carried west in a covered wagon in the 1850s. Sisco died a few years later, but by then, Diane Whealy says, "three of us were growing that bean."

By 1980, the Whealys had three children, and Seed Savers had become the centerpiece of their lives. Membership was expanding. Boxes and bags of seeds were piling up. But life on the land wasn't easy in rural Missouri. The couple felt isolated. "We realized you couldn't make a living selling strawberries," Diane recalls. They wondered if they could turn Seed Savers into a livelihood. It didn't seem likely; at the time, the $5 membership fees brought in just $3,000 a year.

Then Kent won a $5,000 grant from the Rodale Foundation, and the family headed for Decorah, in northeast Iowa, 20 miles from where Diane had grown up. Arriving with a U-Haul full of seeds, they rented a river-bottom field and grew a five-acre garden of 2,000 vegetable varieties the first year. All the blossoms dropped off in a drought, but with water diverted from the river to irrigate the field, the plants bloomed again. The Whealys rented a house, kept boxes of Seed Savers brochures in the bathtub and did huge mailings at the kitchen table. Kent, who had studied journalism at the University of Kansas and later worked in a print shop, mastered the art of grant writing. When the Whealys bought their own land, foundation awards helped to pay for it. Seed Savers kept expanding, and in 1990, the couple received a $275,000 grant from the MacArthur Foundation.

Today, a descendant of Grandpa Ott's morning glory adorns the barn at Heritage Farm outside Decorah, and hundreds of visitors arrive every summer. Kent Whealy, a sturdy baby-boomer with a neat silver beard, strolls through a garden of sprawling oddities: purple potatoes, blue kale, five-color chard. Nearby are tomatoes shaped like bananas, tomatoes white as snow, tomatoes striped like tigers. There's a Polish double-barreled zucchini that looks like green binoculars, and a watermelon called

RIGHT: Home gardeners can preserve tomato seeds much as Seed Savers does. Harvest fruit fully ripe, chop and squeeze pieces to free seeds. Cover with water and stir; pour off the pulp and immature seeds, which float. Good seeds, which sink, are covered by gelatin that prevents germination. To duplicate the natural fermentation that would remove this covering, let seeds soak in a warm place. In about three days, when a furry mold covers the surface or bubbles rise, rinse thoroughly and drain. Seed Savers places the seeds in coffee filters, they'd stick to paper towels. Use a fan to speed drying, or dry naturally. Don't leave them in direct sunlight or put them in the oven. Store in an airtight container in a cool, dark place.

LEFT: *Working on a 10-year rotation, Seed Savers grows all varieties of several crops each summer. When sunflowers were chosen last year, every variety was prepared for a documentary photograph.*
BELOW: *Diane and Kent Whealy stand behind old-fashioned vining petunias in the decorative garden, the red flowers behind them on a trellis are scarlet runner bean.*
OPPOSITE PAGE: *A multitude of kales came from one of Seed Savers' 10 collecting expeditions to Eastern Europe in the past four years. Sealed in clear bags are a few of 3,500 beans in the organization's care.*

Moon and Stars with what appear to be signs of the zodiac in yellow on a brooding, dark green skin. He shows them off, occasionally pausing to crush and sniff a leaf or pluck a presumptuous insect. "It's a living collection," he says.

Workers grow some plants in cheesecloth cages to keep the lineage pure. Not far away, Kent Whealy points out what some would call weeds—they, and marauding insect pollinators, account for the netting. "Queen Anne's lace is a wild cartor. It would cross with ours if we didn't grow them in cages," he says.

One of 11 full-time workers pushes a wheelbarrow of vegetables into the barn, where the harvest gets chopped, soaked and fermented to kill seed-borne disease. The seeds are picked out and dried on coffee filters in the breeze of electric fans. Workers place dried seeds in cool storage. They also freeze duplicates, which keeps them viable up to 10 times longer. Grandpa Ott's seeds are among those in the freezers.

Kent Whealy boasts that Seed Savers has kept from extinction thousands of beans, peppers and tomatoes and hundreds of peas, squashes, lettuces, corns and melons. But more varieties are threatened. Inside Seed Savers' new office-storage-research complex, he waves at his son, who is working on potatoes in a glass-walled lab. A cellpack of sprouts sits in a window. One of the spindly plants, its two leaves drooping, is the last known individual of the variety (called Matsuyama) on earth, Whealy says. Despite meticulous care and a healthy blast of sun, the plant still looks frail. But, he says, 700 other potato varieties are safely preserved.

Largely because of the Whealys' work, many of the big seed companies such as Park and Burpee now offer heirloom seeds again, with much fanfare. The couple is delighted. "That's all we ever wanted," Diane Whealy says. "Our goal is to have the seeds offered by seed companies and grown in gardens."

But she and Kent remain vigilant, and Diane tells another family story to illustrate why. "My parents garden every year. They didn't save seeds, they bought all their seeds from a catalog. Then one year Mother couldn't find a favorite bean, called Empress. She phoned the company and they told her it was discontinued." Diane smiles. "But Seed Savers had it, and I gave it to her—and now she saves seeds too. That's what we want to happen. We don't want to freeze seed in a vault. The best way to preserve it is for gardeners to be growing it." ■

Joining the Movement

About 8,000 people belong to Seed Savers Exchange. The $25 fee entitles members to order seeds directly from other members via the group's yearbook, which is not a seed catalog but a networking directory. Members who offer seeds get a discount on their purchases and may order varieties that are especially rare. Seed Savers also sells a limited array of seeds, along with books and garden implements, to nonmembers. Gardeners with more specialized interests can join Native Seeds/SEARCH, in Tucson, Arizona, which works to preserve the Native American crops of the Southwest, concentrating on chilies, gourds, wild beans and cotton as well as more conventional food crops. People who think they have a wonderful, unusual variety should consider preserving it as if it were unique. Identifying strains is next to impossible, and names are unreliable. Seed Savers, for example, is growing what seems to be the same tomato variety under 30 different regional names. "We don't try to determine if two are the same," Whealy says. "We keep everything."

FOR SOURCES, SEE DIRECTORY—PAGE 141

Five miles from Fort Ticonderoga, site of a pivotal Revolutionary War victory by Ethan Allen, a Vermont barn awaits its demise—only to have its frame reincarnated as the great room of a barn-house on the tip of Long Island. opposite page

B A R N

AN AGING VERMONT COWSHED BECOMES THE SPIRITUAL HEART OF A NEW YORK COUNTRY HOME

A G A I N

BY NANCY STEDMAN PHOTOGRAPHS BY DAVID BARRY

LEFT: Apprentice Jesse Grant peels away the siding of the old barn.
BELOW: Project head Ken Epworth assembles the frame on the ground, using mortise and tenon joints fixed with hand hewn pegs. "You either like an old-wood person or you're not. Some guys can't handle the splinters."
TOP: Cranes hoist the bays into place on their new site.

While stripping the roof off a sagging Vermont barn on a sunny May day, Ken Epworth looked down at the herd of holstein cows grazing in the pasture below. One animal lay on the ground and delivered a calf. Epworth marveled at the sight. "The first calf means that spring is finally here."

Over the next two weeks, the herd increased by another 40 calves as the English-style hay barn, which had seen more than 200 snow-packed winters, gradually disappeared from the pasture in the western Vermont town of West Addison. But the following spring saw a more surprising birth as the barn—or at least parts of it—was reincarnated as the great room of a traditional cedar-shingled house in a wealthy enclave on the East End of Long Island.

Epworth's company, The Barn People, is one of a handful in the United States that purchases, dismantles, restores and reassembles vintage barns and outbuildings. Since 1974, Epworth, a house restorer who studied at the Rhode Island School of Design, has relocated dozens of Vermont barns throughout the country. On occasion, he reassembles an old barn "to be just an old barn." But more often the barns' bones are resurrected in the homes of clients eager to make an architectural statement with all that old-growth timber.

In the 1800s, Vermont had more than 34,000 dairy farms; today there are fewer than 2,000, which means a lot of barns are rotting away from neglect and disuse. Only about one in 25 Epworth sees, however, has the pleasing proportions and sturdy frame suitable for a house. These recyclable barns—for which Epworth pays an average of $5,000 and sells (including shipping and assembly) for an average of $30,000—are a simplified network of beams with siding and a roof cover. "Dismantling a barn is a lot easier than dismantling a house, which has much more interior fabric and embellishment," he says.

The West Addison barn is his fourth collaboration in 12 years with Tom Woodard, a New York antique quilt dealer who has made a sideline of transforming barns into houses near his own Long Island home. "Tom knows how to keep the essence of a barn," Epworth says. "He uses old wood on a couple of the walls instead of just the ceiling. And he leaves the space open rather than cutting into it with an upstairs loft, so you still have the feeling of a barn frame."

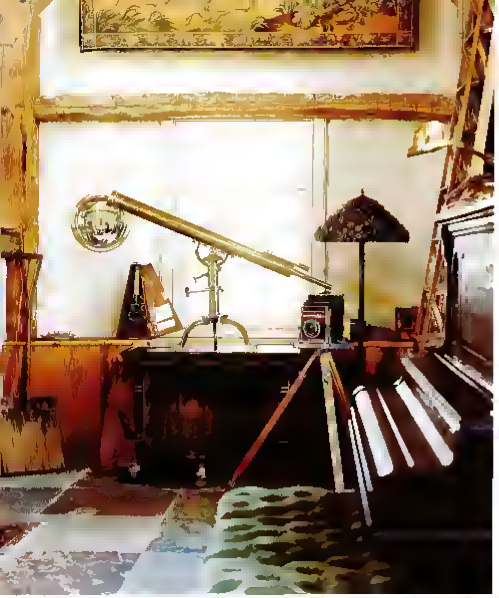
When they first saw the three-bay West Addison relic, both men immediately recognized its potential. The timbers, held together with wooden pegs, had a warm patina, mellowed to the color of clover honey. The 26-by-39-foot frame lent itself to an open cathedral ceiling, which Epworth believes shows the structure to best effect. "There are masculine barns with massive, roughly hewn beams. And there are feminine ones, where the wood has a soft, worn color. This barn has both qualities. It's androgynous," he says.

Although everyone around West Addison referred to it as the sheep barn, no one was sure when the shed last lived up to that moniker. "Old Vermonters put a name on something, and it sticks forever," says Suzanne Hunt, who with her husband, Robert, bought the 237-acre dairy farm in 1989. By then, with its roof caving in, the barn wasn't even good for storing hay and machinery.

Epworth refuses to dismantle "a building about which people have been saying for the last 100 years, 'Take a left at the red barn.' There are farms where it feels like you're knocking out someone's front tooth when you take down the barn," he says. "It's depressing because once a barn is gone, it usually means the farm is gone. Those seventy- to eighty-year-old hill farmers who eat pie for breakfast and wear long johns three-quarters of the year are disappearing fast. What's next for their land? A shopping center?"

But he had no qualms about taking down the Hunts' barn.

Epworth's plans were so precise that he and one helper constructed the great room frame in just a few days. The rough-hewn timbers attest that the barn was hand-built by a farmer, not by one of the master framing crews that roamed the countryside after the Revolutionary War.



LEFT Although barns typically have small windows, Tom Woodard installed large windows in the new house to provide light and a touch of modernity. BELOW The uncomplicated framework of the old barn is particularly suited to cathedral ceilings.

because it was already in a state of near collapse. "We decided to sell it rather than let it fall in," Suzanne says. "We just wanted to have it reused, to keep part of Vermont's history from being destroyed."

When they started dismantling the barn, Epworth and his apprentice, Jesse Grout, proceeded from the top down, undoing the work of the anonymous 18th-century farmer who axed hemlock and oak trees to make the posts and beams. The two men pried off the tin roof added by a later owner, then the sheathing, exposing totted three quarter round rafters hewn flat where they met the roof.

With the precision of surgeons, Epworth and Grout peeled back the siding to reveal the skeleton. "You know it's there but it's exciting to finally see it," Epworth says. "It's sculpture, wood shaped by hand." They scrubbed away bay and cobwebs with wire brushes, yanking out nails as they went. After bracing the frame with 2x4s to keep it stable, the men popped out the wooden pegs and labeled each piece of the framework to correspond to coded drawings. It took five hours and a crane to lower the frame to the ground, where a crew dismantled and loaded it onto a flatbed truck bound for Epworth's workshop 75 miles away in Windsor, Vermont. There, over the next month, five workmen used epoxy to splice wood salvaged from other barns into damaged lumber, careful to match the color, character and joinery. In the end, only a quartet of the barn's heavily weathered siding and roofing boards were unusable. The rafters were a complete loss, but three-quarters of the frame, Epworth's main concern, passed muster. As a final step, workers fumigated the wood with methyl bromide, a pesticide used on grain.

Before shipping the wood to New York, they test-assembled the frame on the ground and squared up each section. Even minute corrections were fed into a new set of blueprints for the Long Island house. Five months later, after Epworth and Woodard finished fine tuning the plans for the boxy Long Island house, local contractor Ron Gray of Graystone Builders laid the foundation. At the house's center is the great room, with a wing on either side for bedrooms, bathrooms, a kitchen and a family room.

Siding from the old barn became paneling on the two long walls of the great room, and roof boards covered the ceiling. Heavy hardwood rafters with square cross-sections salvaged from yet another Vermont barn replaced unusable three quarter-round rafters from West Addison. An old beam too damaged to serve as a part of the frame became a staircase banister.

For the exterior, Gray says, "We built a frame with conventional walls of 2x4s around the perimeter of the barn, plus batt insulation. It takes the roof load and, since it is plumb, allows us to install windows and doors plumb even though the barn may not be straight." In rooms with vintage beams, Gray matched flat walls to rough antique wood. For each beam, a carpenter set a level line and took a scribe of the wood before cutting the wall with a jigsaw to match.

Although Epworth was able to frame the great room in just a few days, finishing the entire house took 10 months. Along the way, he and Woodard altered some of the proportions of the original barn. In the great room, they raised some horizontal ties for door openings and moved several beams that were too low or would have blocked the fireplace.

The fireplace itself presented an aesthetic dilemma. "Fireplaces seem like they don't belong in a barn, so we tried to make this one look almost structural, with stone siding and an oak post-and-beam frame," Woodard says. His choice did not sit well with the eventual owner, Lauren Howard, president of the New York–based interior design firm LRHomes. "The fireplace should be *massive*," she insists. Her first priority, however, was replacing the doors to the bedrooms of her teenage daughters, who worried people could peek through the wormholes.

In its new incarnation, the old barn bears little resemblance to its former self. Outside, the only barn-like features are a red front door and two-story high sliding barn doors that bookend it. But inside, the golden, hand-hewn timbers tell a more complex story of New England forests and generations of hard-working, self-sufficient Yankees. The roof is slightly more pitched, and the cows of West Addison might not recognize their familiar haunt. But the old barn's integrity comes through in every plank and beam. ■

FOR SOURCES, SEE DIRECTORY – PAGE 167

In lieu of floorboards, Woodard decided on Chinese multicolored slate underfoot. "Otherwise, you'd feel like you were in a cigar box."

"I'm a jeweler on a larger scale," says Jeff Gammelin, perched on a granite boulder at the ruins of an old quarry on the Maine coast that has been a source of stones for several of his fireplaces. Gammelin's quest for fireplace gems has also led him deep into the Maine woods, where he has found abandoned dry-stack stone walls built by pioneer farmers.

stonesmith

JEFF GAMMELIN'S FIREPLACES WILL STILL BE STANDING 2,000 YEARS FROM NOW

BY WALT HARRINGTON

A mountain is rising in the living room. Waist-high boulders have been laid as jambs on either side of a yawning mouth. Overhead, through a hole in the high roof, a gargantuan beam of Maine's Deer Isle granite as long as a sofa and as heavy as a car hangs motionless on the end of a descending cable. That stone—9 feet, 2 inches long, 20 inches high, 10 inches thick, 2,228 pounds—will span the jambs as the lintel of a monumental fireplace. Around those stones, 47 huge rocks will be laid 10 feet high and 11 feet wide, creating the illusion that you are at the entrance to a cave, that you are standing before the rocks of Stonehenge, that you are staring up at the giant, broken steps of Chichen Itza. A year from now, when the house is done, a fire blazes and people sit comfortably with the lights dimmed and gentle music playing, they will at times be transported, feel as if they are not outside that cave looking in but inside that cave, surrounded by stone, safe.

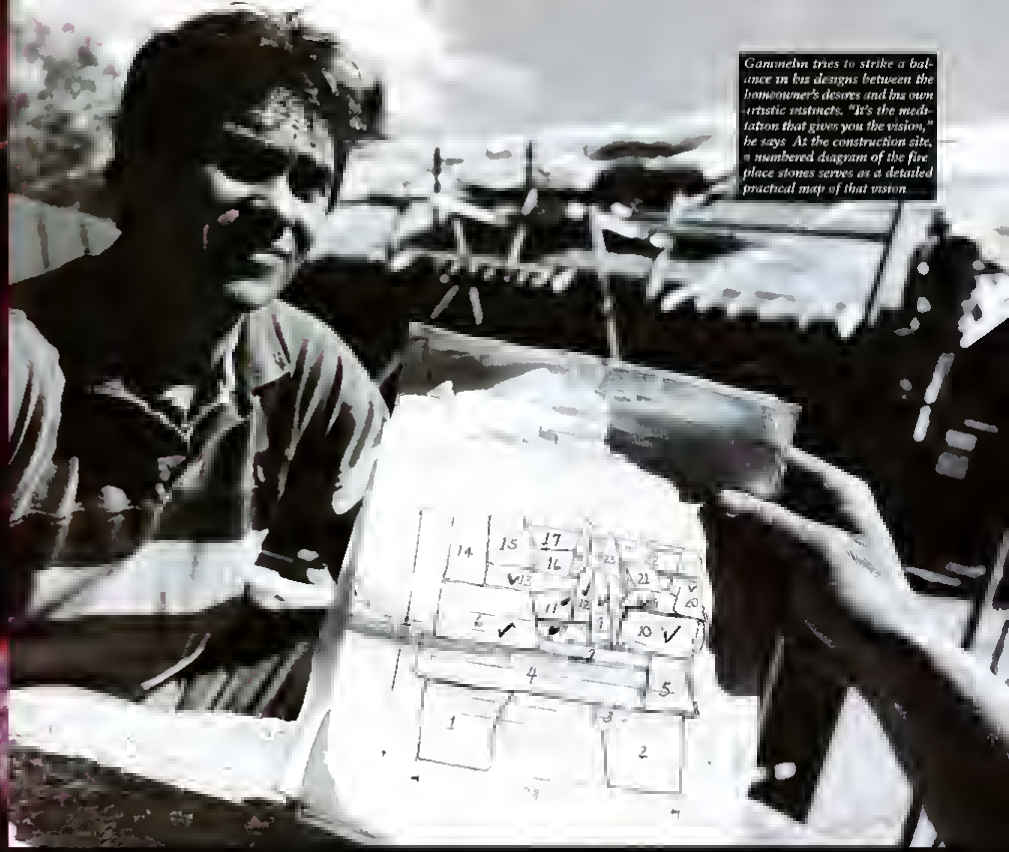
"I don't think it's gonna torque," Tom Brennan says in the here and now. He cranes his neck to study the suspended lintel. Behind the stone, through the hole in the mansion's otherwise finished roof, the gunmetal seacoast sky scuds past.

"We'll see," Jeff Gammelin, the monument's creator, says softly.

He stands a few steps back from Brennan, looking up and then panning down

PHOTOGRAPHS BY MICHEAL McLAUGHLIN

Gammelin gently hammers anchors into a chunk of granite that will become a fireplace lintel. "You can feel if you're not getting enough meat, not digging into the stone enough, not hitting it right," he says. "You hear a good solid thunk when it's done right. You hear confidence and control."



Gammelin tries to strike a balance in his designs between the homeowner's desires and his own artistic instincts. "It's the meditation that gives you the vision," he says. At the construction site, a numbered diagram of the fireplace stones serves as a detailed practical map of that vision.

across the exposed first-floor ceiling beams that run perpendicular to the fireplace's still naked cinder-block tower. The lintel slab must be snaked down through those beams along the side of the blocks, swiveled 90 degrees and then brought to rest on the jambs.

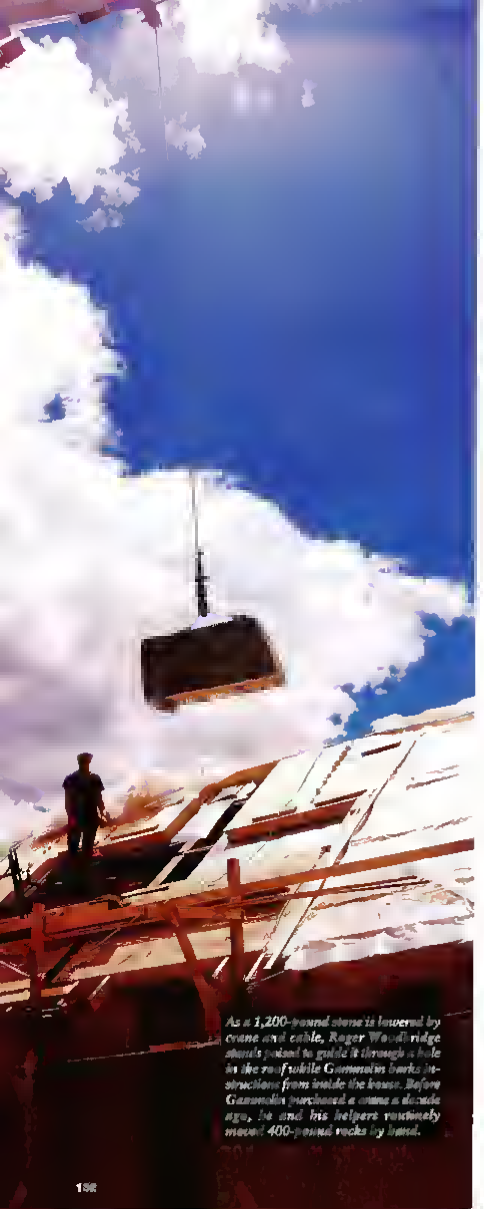
"Swing to the right!" Brennan yells to the boom jockey. "Hold it!"

The crane goes mute, the lintel stone tugs and halts, and the cable ripples along its length like a flexing muscle. Even in the silence, Gammelin's voice is almost inaudible.

"We're there."

He takes off his right glove, reaches out and touches the lintel stone with his fingertips. It's cold, the surface sharp with deep-green lichen that has colonized the rock for who knows how many eons. It grows like a miniature forest atop the erratic ravines and rises of the stone's face, which has not been cut by diamond blade or spalled by rosebud torch, scored by carbide trace or fractured by feather and wedge. It is natural rock, a ledge, an outcropping, a seismic fissure—fireplace as ornamental geology.

Gammelin is a small and wiry 47-year-old who today wears tan work pants, a black sweatshirt, Nikes and a San Francisco baseball cap cocked back on his head. After more than 20 years of hefting and lugging stones for the hundreds of fireplaces his Freshwater Stone & Brickwork has built in homes around Orland, Maine, his muscles have outgrown his frame, like Popeye's. Over the years, Gammelin has gone from building fireplaces with stones that one man can carry to building fireplaces with stones that only boom trucks can lift. He has gone from using stones shaped by nature to boulders he and his men sculpt with fire and tools. He has built with bigger and bigger stones not only because it is his vision but also because new equipment and tools have made it possible. Yet that mastery and growth of craft doesn't explain what drives



As a 1,200-pound stone is lowered by crane and cable, Roger Woodbridge stands poised to guide it through a hole in the roof while Gammelin barks instructions from inside the house. Before Gammelin purchased a crane a decade ago, he and his helpers routinely moved 400-pound rocks by hand.

Gammelin never to build again what he has built before, doesn't explain his obsession with never settling.

"I don't understand it myself," he says. "It's grow or die."

He removes his hand from the lintel, puts on his glove. "A good stone," he whispers.

"Boom up!" Brennan now hollers. "We gotta scoot it the width of a line." Brennan, a master stonemason who has been with Gammelin for 11 years, leans close to the lintel, squinting to check the layout marks that signal its proper location on the jambs. Nothing on this fireplace—whose chaotic stonework makes it the most unusual Gammelin has ever designed—or any Gammelin fireplace is left to chance. Each stone has been marked for its exact left to right, front-to-back position. Each rock's precise depth, angle and cant has been determined back in the shop. The fireplace was mocked up, the stones numbered and diagrammed, then dismantled and shipped to the house, where this week it will be reconstructed to within a sixteenth of an inch of the original layout marks.

Gammelin began making mock-ups eight years ago when a skeptical architect had trouble visualizing what a certain design would look like. Gammelin laid out the fireplace on the ground and raised the architect on a forklift. After that, he mocked up all his fireplaces in the shop. No more hauling tons of stone to jobsites, angering contractors for taking up too much space. No more spur-of-the-moment decisions.

"We gotta go a quarter inch," Brennan yells. He squints and cranes his head again and hollers, "Take it up!"

Sometimes, in quiet moments late at night or on long drives on winding rural roads, Jeff Gammelin thinks about what he has accomplished since he and his wife, Candy, packed up their old Datsun after college in 1972 and wandered the East Coast looking to buy land in the country. Prices didn't get low enough until Maine, where their quest ended in a wooded, rocky pasture—80 acres for $16,000. No sewer, water, electric or gas. They got jobs as teachers. Gammelin built a windmill for power, had a well drilled and built the two rooms they called a house. In the winter, they'd awaken with snow on their blankets.

A few years later, Gammelin decided to use the stones littering his land to build a fireplace, around which he planned to erect a real house. He had grown up in a New Jersey lake-retreat-turned-suburb, where the original bungalows and their fireplaces had been made with rugged native stone and rustic timbers. With this image in mind, he began to build. No wimp of a fireplace, either, but a muscular 16-foot-tall, 12-foot wide fireplace. Gammelin walked his land, stone-picking—flat stones, flat stones, long, short, round, jagged stones, white, gray, brown, a vein of lavender, a swath of pink. He built his fireplace with a mind as clear as a glass of fresh water—no experience, no knowledge, no preferences in texture, color or shape, no claims to art.

One day, standing in the second story of a barn he'd built, Gammelin looked across the field at his nearly finished fireplace, which stood like a reverse ruin, rising, not falling. Suddenly, he saw consciousness at work. The rocks had runs that traveled like grain in a crosscut of wood, chaotic yet orderly. Large stones coursed heavily and then blended into rivers of gentler, smaller stones that gave way to stones of still more shapes and sizes, all of them woven together by streams of mortar that Gammelin had blindly troweled stone to stone. From the distance, the rocks of many colors lost their craggy personalities and became a single canvas resembling the bold, natural colors of a Gauguin painting. Stunned, Gammelin thought, "Maybe I could do something with this."

He built a fireplace for a friend. Then he got a paying customer. He quit teaching. In the two decades since, he has never been without work. From building a fireplace in his own house with scavenged stones, he went on to build $70,000 fireplaces in vacation homes of the painlessly wealthy. More important, he went from building with oneself-conscious intention to working with a conscious philosophy: Each fireplace should be different, in either grand or trivial ways, from the last.

"You're there!" Brennan hollers as the descending lintel comes to rest on the jambs.

"No," says Gammelin, "we're in too far." He grabs a crowbar, wedges it between lintel and jamb and begins to "walk" the lintel away from the cinder block tower. Brennan, the fussbudget of the two, is cringing, afraid Gammelin will chip the rock's face.

This fireplace may be Gammelin's creation, but it's Brennan's baby. Gammelin doesn't build his fireplaces alone, nor does he envision them alone. The couple who own this house, for instance, wanted a unique fireplace. Gammelin did several designs using long, narrow stones to mimic the horse's ceiling beams. No go. The wife decided she wanted the new fireplace to remind her of the one Gammelin had already built in their nearby studio house. It was a huge, flat-faced, rustic but formal fireplace made of a dozen giant, dark granite "tailings"—stones cut and left as waste in an old quarry operation. She also wanted the fireplace-in-progress on the first floor linked to the upstairs fireplace, which was designed by the architect to be built at a 45-degree angle to the fireplace beneath it.

Gammelin's solution: At the jambs, the lintel and the upper left of the fireplace, he used granite boulders like those in the formal studio fireplace. But at the upper inside corner of the right jamb is a slightly cantilevered stone that looks as if it has broken off and is about to slide onto the hearth. The lintel is actually resting on the right jamb, but the one-ton rock looks as if it's sitting tenuously on this splinter of stone, which is secured to the jamb with a stainless steel pin. That's the first hint that something strange is going on. Above the lintel, the dark, staid stones on the left transform in the center into smaller, rugged, more colorful stone fingers that, like a volcanic eruption, suddenly shoot up from horizontal to vertical and tip, twist and cantilever every which way, as if they're about to tumble to the floor. Like a book, the fireplace reads from left to right—from predictability to chaos, conformity to nonconformity. Moving to the far right, the stones eventually extend two feet beyond the front plane of the fireplace and turn to a 45-degree angle, creating the illusion that they support the fireplace upstairs.

Gammelin waits for the crane boom cable to be shifted so he can reposition a stone that has just been lowered through the hole in the roof. Hefting and carrying huge rocks still gives him a thrill. "There's definitely a rush, more than I've gotten from any other physical work," he says. "And there's teamwork. It's a dance."

Brennan pauses in his work. "Where'd you get the idea?" Gammelin shrugs. "I closed my eyes and got it."

The men spent a week in the shop moving stones in and out, as if they were trying on different costumes. Brennan gathered the stones and Gammelin selected from among them, decided their horizontal or vertical angle, their forward tilt. Then Brennan used an oxy-propane torch to fit each stone against those next to it. The heat dries out moisture near the surface of the rock and causes it to flake off in fine layers, which leaves a natural-looking edge. He used a German set chisel, a hammer and arm muscle to break away large chunks of stone. To make clean cuts, he used a carbide tracer and hammer to score a fine line and then pounded V-shaped feather-and-wedge anchors into holes drilled along that line, fracturing the stone crisply.

This fireplace Gammelin built in a home at Deer Isle, Maine, is one of his proudest creations. The wood boxes on each side give off a warm glow when a fire is blazing, because they are separated from the firebox by sheets of tempered glass.

He cut the jambs on their outer sides to fit them to length and rubbed the edges with shards of granite to hide the fresh cuts. It is a Gammelin rule. No stone face and no run of jamb or lintel that faces the firebox is ever touched. "They'll stay green with lichens forever," he says.

When Gammelin began stonework, he wasn't such a perfectionist. His father had owned an appliance store, and the son was always amazed at the intensity with which the man worked. But Gammelin discovered the same intensity in himself. He studied Gauguin's paintings and saw in "Jacob and the Angel," "Siesta, Tahiti" and "Riders on the Beach" the colors and shapes he wanted to see in his fireplaces. He studied photos of stone walls in Ireland and England, the monoliths of Stonehenge. He scoured the Maine countryside for stone houses and walls to see how they'd been built. He examined the geometry of mountainsides, how renegade rocks jut and flare. He wandered rocky blueberry bogs and found stones split like onions by weather and time into layers—stones that could be reconstructed, as if to thwart geological time.

Gammelin decided he hated stonework that "floated" in thick veins of mortar, because the stones didn't touch, didn't look as if they were standing of their own weight, one atop the other, as God would lay them. He decided that stonework is a channel to something primal in people. His customers talked of the comfort they felt sitting before his fireplaces, as if they were inside a cave with a fire burning, or walking along a rocky shoreline from childhood, or stumbling upon a basseting outcrop of stone while hiking in the woods.

For years, Gammelin felt it was a privilege just to have the chance to build a fireplace. He got more practical with age and three daughters. He better calculated costs and profits and health plans. But he wonders if he ever would have gotten to where he is today—with 22 employees and a $1.5-million a-year business—if it had not been for his obsession with never building this time what he built last time.

"I doubt it," he says. Gammelin gives people what they want, it's their home. "But the challenge is not to sit on what you've done. You have to control your materials, tools, vision and situation. You have to grow on the craft end to do more on the creative end." Investing in cranes, for instance, has allowed Gammelin to build with stones as heavy as 10 tons, giving him more creative freedom. Diamond-blade saws cut thick granite stones that steel blades never could. Modern torches allow more subtle shaping of stones than chisels.

"But tools are tools," he says. "They're meant to take you where you want to go. What comes first is the drive to keep yourself interested, to still be a little sad when the workday ends, to never lose touch with the thrill of doing it."

This fireplace has been a thrill to do. The boom cable is gone, and Gammelin and Brennan have troweled mortar between the jambs and the now-seated lintel. They've parged mud on the cinder blocks behind the rocks and filled the several-inch cavity between tower and stone. They're now on their knees pointing the mortar between the stones inside the fireplace's mouth. Brennan uses a mason's thick trowel. Gammelin uses the handle of a soupspoon, his tool of preference since he built his own fireplace 20 years ago.

"I still hate floaters," he says. Gammelin wants each stone to sit on the stone below in at least two places. His trademark technique for making the structure look as if it's resting upon itself is to scrape the mortar in the joints back to where the stones come closest to touching. He wants only a tissue-thin layer of mortar between the rocks at their points of contact so the human eye has the impression that they are piled naturally. Then it doesn't matter how wide or narrow are the rest of the mortar joints, because the fireplace will always look as if it's standing of its own weight.

Finally, finished for the day, the two men step back to admire their work.

"Oh," says Brennan, "it looks so nice."

Gammelin nods, a little sad the day's work is done. ■

The finished fireplace: "A lot of what we do is craft," says Gammelin. "We are given a problem and we use experience to solve it. But rock to rock, where each goes next, is artistry."

INVISIBLE PERIL

Why you may be breathing poison gas from your garage—and what to do about it

The nightmare began on an ordinary November night in an ordinary house in central Iowa. Jim and Kristi Gubbels were in the basement of their 1960s ranch when, seemingly out of the blue, their new carbon monoxide detector went off. Both felt fine, so they simply reset the detector. After it sounded again, Jim called a heating contractor.

The contractor spent a couple hours testing the furnace and water heater but couldn't find the source of the gas. Then, as he was packing his tools, his detector showed carbon monoxide levels above 70 parts per million in the house. That's eight times the allowable federal level for outdoor air. Most firefighters responding to a carbon monoxide call would enter with gas masks if they detected that amount at the front door.

"Jim," the contractor said, "you guys shouldn't stay in the house tonight."

By then Kristi's lips were tingling, and Jim's eyes burned. They worried that their 2-year-old, Nick, was in trouble too. So they woke him around midnight and headed to the hospital, where tests revealed all three had slightly elevated carbon monoxide levels in their blood. They were given pure oxygen to breathe.

All the next week, while the family camped out with Kristi's parents, Jim racked his brain trying to figure out the source of the carbon monoxide. After reading his water-heater manual, he thought he had solved the mystery: He added more rise to the vent. The

Armed with a portable computer and an electric fan and using theatrical smoke to reveal hidden paths taken by a stealthy menace, gasbusters Steve Klossner, left, and Tom Gremer stand poised to eliminate the carbon monoxide threat in Jim and Kristi Gubbels' garage.

BY LAURENCE ROY STAINS PHOTOGRAPHS BY JASON SCHMIDT

family moved back home, and Jim bought a better detector that gives instantaneous readouts Everything seemed fine—until Kristi, who runs a desktop publishing business out of an office in the basement, noticed levels on the detector had climbed past 20 ppm

"I was absolutely frustrated," Jim recalls "I was thoroughly mad."

In the weeks that followed, the local gas company visited three times but found nothing. Another heating contractor said the eight-year old furnace had a cracked heat exchanger (it didn't) and advised Jim to buy a new furnace. Meanwhile, the new detector went up one day to 77 ppm

Shortly after New Year's, a friend suggested Kristi call Tom Greiner at the Iowa State Extension Service Greiner has a Ph D in engineering, he also has a reputation for relentless investigation of carbon monoxide problems After half a dozen visits to the Gubbels' home, Greiner made a startling discovery The carbon monoxide in the house was coming from the garage

Only steps from the two doors to their garage, the Gubbels family sits down for breakfast Calm moments are rare in a household juggling the demands of a 2-year-old and Jim's job as a park ranger, but soon they will be even more scarce Kristi became pregnant days after the family freed itself from the poison coming in from the garage.

EVERY MORNING IN AMERICA, where some 30 million houses have attached garages, homeowners open the garage door and start the car. On cold winter mornings, while waiting for the engine to warm, they kill a few minutes adjusting mirrors, flicking a soggy corn flake off a shirt—or go back in the house to retrieve a briefcase or a toddler. Finally, they back out and close the door, not realizing this morning ritual is enough to pose potential health hazards for the family. Even if that huge garage door is open while the car warms up, the air dynamics of a house are likely to suck carbon monoxide inside

No one can afford to be blase about carbon monoxide A colorless, odorless gas that weighs the same as air, it is the nation's number one poison, having killed 11,547 people between 1979 and 1988, reports the federal Centers for Disease Control (The runner up poison, heroin, killed half as many.) And the total doesn't include the 3,000 suicides from inhalation of carbon monoxide annually, or the estimated 10,000 Americans who visit emergency rooms each year with symptoms of carbon monoxide poisoning Carbon monoxide in the workplace has been a concern for decades, but worries shifted to the home only recently, after inexpensive detectors became widely available Now 16 million homes have them—and alarms are going off all across the country, often for no discernible reason Fire departments and gas companies complain of spending so much time on false alarms they don't have time for real emergencies

There is no practical way to improve the seal between the Gubbels' attached garage and their house because obvious gaps have already been plugged Doors are weatherstripped, and the garage walls and ceiling are covered in drywall.

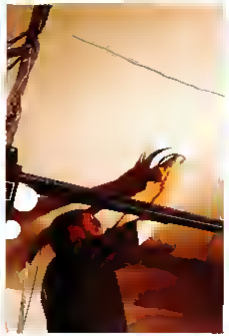
In Minneapolis, carbon monoxide calls to the gas utility, Minnegasco, jumped from 5,000 to 13,000 to more than 21,000 over the past three winters The company sent inspectors each time, but four out of five times they found nothing amiss So in late 1995 the utility hired Steve Klossner, a "house diagnostician" from Lakeland Shores, Minnesota Were there indeed sources of carbon monoxide great enough to set off all these alarms? Or were the detectors flawed? During the 1995-96 heating season, Klossner called on 50 Minnegasco customers whose alarms had sounded at least twice for no apparent reason Klossner used sophisticated equipment, spent hours at each house and emerged with a surprise In 34 of the 50 houses, the problem wasn't one of the usual suspects—a dirty furnace burner, a blocked flue or a gas water heater with too little draw in its exhaust vent. Nor was it a faulty detector In three out of four cases, the source was an attached garage

The protocol was this. Klossner would arrive at each house in the morning, open the garage door, start the homeowner's cold car, let it idle for 45 seconds, then shut it off and close the door In winter, when cold internal combustion engines can't burn fuel efficiently, those 45 seconds were enough to fill the garage with carbon monoxide. Over the next few hours, the gas typically got sucked into the house By noon, more carbon monoxide was in the house than in the garage In one house, Klossner recorded 85 ppm in a child's bedroom.

Air flow through houses is subtle but persistent, particularly in winter. When inside air is warmer than outside air, it rises and escapes—exfiltrates—through cracks around windows, attic stairs and plumbing vents Because nature abhors a vacuum, escaping air is replaced by outside air that enters—infiltrates—through similar cracks lower down on the house This natural air movement is called the stack effect Add a roaring fireplace, a bathroom fan, a rangetop grill or a clothes dryer, plus a furnace that's sending hot gases up the flue, and the house needs to suck in even more outside air. Klossner found that his 50 houses drew an average of one-fourth of their outside air from the attached garage One house drew only 2 percent, and one drew a startling 85 percent

After Klossner completed the study, his liaison at Minnegasco, Matt Wilber, manager of codes and standards, made a short video demonstrating the garage-to-house connection. Wilber borrowed a house with a two bay tuck-under garage in Burnsville, Minnesota He put a theatrical smoke generator in the garage and filmed the smoke as it seeped into the house around trim moldings, floor registers and switchplates. In half an hour, every room in the house was smoky. Yet outside on the driveway, nothing emerged from behind the closed garage door

About 15 minutes after Klossner and Greiner fill the Gubbels' garage with theatrical smoke, it streams under the weather-stripped door to the house and billows down the stairway to the basement Meanwhile, thin wisps trail from an electrical outlet.



JIM AND KRISTI GUBBELS had bought a carbon monoxide detector only two weeks before that November night when it went off and sent them packing. They got it because Kristi had been complaining of daily headaches "They were right between the eyes things," she says "By eleven or twelve o'clock every day, they were just atrocious." After she breathed pure oxygen in the hospital, she says, "it was the best I'd felt in a long time I was a whole new person."

Carbon monoxide wreaks havoc in the body because it latches onto hemoglobin, the component in blood that carries oxygen to cells Carbon monoxide binds to hemoglobin with 240 times more sticking power than oxygen Soon cells can't get the oxygen they need. A headache is one classic early symptom of carbon monoxide poisoning; fatigue, nausea and dizziness are others Higher concentrations cause increasingly serious symptoms, from disorienta

LEFT: Because the Gubbels house is so tight, fresh air is brought into the furnace room through a 6 inch duct draped down the basement wall, and a new double-wall metal pipe with a small fan is installed for the water heater's exhaust. MIDDLE: In the garage, two round vents are placed in the ceiling. RIGHT: The vents are connected to ducts with a variable-speed tube fan that sends garage air out through a roof vent.

Monitoring Carbon Monoxide

Carbon monoxide detectors range from the breathalyzer above, demonstrated by photographer Jason Schmidt, to plug-in models.

To protect yourself from malfunctioning appliances, you need at least a basic $30 model, which sounds an alarm when concentrations reach a dangerous level. The threshold used to be as low as 15 parts per million over an eight-hour period but in 1995 was raised to 15 ppm over a 30-day period to reduce the number of supposedly false alarms.

To track lower, fluctuating levels from an attached garage, you need a detector that displays the current carbon monoxide concentration and the peak exposure since the last time the alarm sounded. The Nighthawk at right, a successor to a model rated best by *Consumer Reports* magazine, costs about $50.

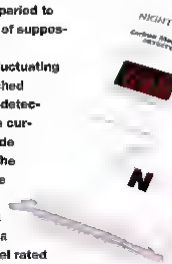
Gas company inspectors and firefighters use $500 detectors that can analyze room air and sample flue gas. The units come with a metal probe that can be stuck directly into appliance exhaust. With the breathalyzer hooked on, it calculates the amount of carbon monoxide in a person's blood.

tion to unconsciousness. Death comes within a few hours at 500 ppm, within minutes at 10,000 ppm.

What happens to people like Kristi Gubbels, who breathe lower levels over longer periods—doses less than 100 ppm over the course of months? Medical scientists are uncertain, but there are increasing concerns. A 1995 study of people in seven American cities showed that when outdoor levels of carbon monoxide rose just 10 ppm, hospital admissions for congestive heart failure also rose—by 10 to 37 percent. A just-published 11-year study of 10 Canadian cities by the government health agency has made a similar finding. Hospitalizations of elderly people for heart failure climbed 16.5 percent when outdoor levels rose from zero to just 8 ppm.

Some researchers claim low levels cause a syndrome called chronic carbon monoxide poisoning, marked by constant fatigue, irritability and difficulty in concentrating, organizing and forming new memories. But a cause-and-effect relationship is difficult to prove. "There's nothing real definite," says Edward P. Krenzelok, director of the Pittsburgh Poison Center and president of the American Academy of Clinical Toxicology. He notes that some people are affected by low levels while others tolerate very high levels. "Who knows what everybody's individual threshold is? The one thing you can say is, you don't need carbon monoxide in your body."

The Gubbels discovered the source of their carbon monoxide problems after Tom Greiner borrowed a $5,800 modular gas analyzer from Iowa State's mechanical engineering department one night last January. Jim started Kristi's 1991 sedan in the garage, let the motor run two minutes, then drove the car out and closed the garage door. The garage air registered 575 ppm.



But was it getting into the house? On his next visit, Greiner asked the family to stay with Kristi's parents, then staged a worst-case scenario. He started the car in their garage and let it run for eight minutes with the garage door closed. Then he backed out and quickly closed the door again. In half an hour, carbon monoxide levels in the house went from zero to 70 ppm. Thirteen hours later, the reading was still 30 ppm.

That clinched it. The cause of all the alarms and late-morning headaches was Kristi's morning ritual. She would open the garage door, start the car, then come back inside, get Nick, put him in his car seat, drive him off to a sitter and return home to work in her basement office. Air dynamics did the rest. The coldest mornings are when cars produce the most carbon monoxide, when everyone lets the car warm up the longest and when the stack effect inside the house is greatest. "Anybody who has an attached garage has the same problem," Jim says. "They just don't know it yet."

After the discovery, Kristi changed her morning routine. She would get in the car and put it in neutral. Because the garage floor is slightly inclined, the car would roll out onto the driveway. She'd close the garage door and start the car outside.

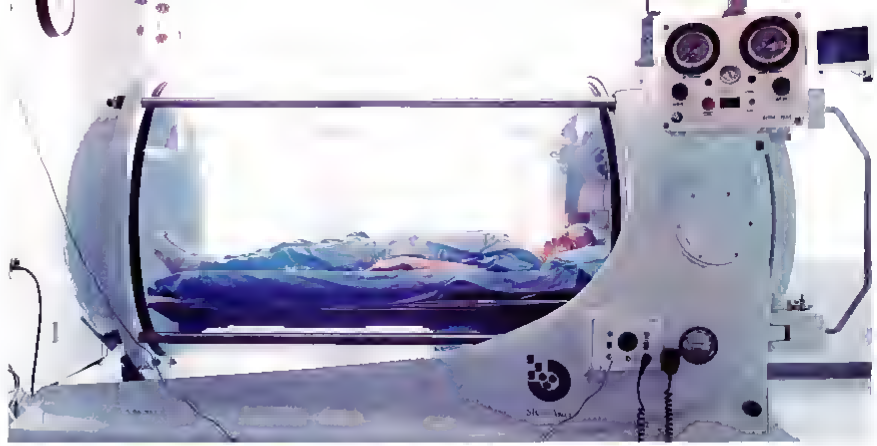
Says Jim, "Our detector has been reading zero ever since."

IS THAT THE ANSWER? Should we all be rolling our cars out of our garages? Steve Klossner has tested three other ideas: passive ventilation up high—installing roof vents in the garage attic, passive ventilation down low—replacing two panels in the garage door with louvers, and mechanical ventilation—placing a simple 150 cfm tube fan so it pushes air from the garage ceiling out a vent in an exterior wall, just like a clothes dryer or powder room would be vented.

Your Garage: A Pandora's Box

Anything that gets into the air in an attached garage is likely to find its way into the house. That means it's a bad idea to spray-paint or lacquer there, or to do a lot of furniture stripping with products containing methylene chloride—which, once breathed into the lungs, is metabolized into carbon monoxide. Solvents and other volatile compounds are best stored elsewhere, such as in a plastic, lockable storage shed outside. Even the concern about cars in the garage isn't limited to carbon monoxide. Gasoline evaporates from carburetors and vented gas tanks, and the fumes contain known cancer-causing components such as benzene.

BARBON MONOXIDE DETECTOR BY KARIN H. HARRAD



Klossner concluded louvers didn't work. When he compared the other options on the test house with 85 ppm in a child's bedroom, the $100 roof-vent job and the $250 tube-fan fix worked equally well. Both brought the house's carbon monoxide reading below 8 ppm. But roof vents are an option only on houses with a garage open clear to the rafters; houses with a ceiling in the garage need a fan. The fan can be connected to a switch and a timer, or left running (at a cost of about 12 cents a day where electric rates are 6 cents per kilowatt hour).

To see how such a fan might be installed, *This Old House* magazine asked Klossner and Greiner to fix the Gubbels residence too. There, ironically, the job came to more than $2,000—complicated by the fact that because Jim has worked so hard to insulate, weather-strip, caulk and replace windows, the house is very tight. Greiner had measured 0.17 air changes per hour, whereas most houses undergo nearly half an air change each hour.

Greiner and Klossner worried that installing just a roof vent or tube fan in the garage might rob the house of the makeup air it needs. When a house can't get enough makeup air, bad things happen. A fireplace or clothes dryer might suck air from the furnace or water heater flue, causing a backdraft of combustion fumes (including carbon monoxide) into the house. Nine of the 50 homes in the Minnegasco study had backdraft problems, and in most of those nine the backdrafting produced a burst of carbon monoxide exceeding 4,000 ppm at the source.

So, much to Jim's initial dismay, a six-inch hole was cut in the side of his house to provide makeup air for both the furnace and water heater. A powered vent was installed on the water heater. In the garage, two ceiling vents were ducted to a fan that pushes air through a roof vent.

When all the holes, ducts and fans were in place, Klossner and Greiner again filled the garage with theatrical smoke. It was soon billowing above the roof—but this time none came into the house. The fan, set at 300 cfm, provided just enough pull to change the air dynamics of the house. The garage is still attached to the house, but in terms of air flow, it might as well be halfway down the block. Jim even cracked the door to the house several inches; the smoke stayed in place. "It was really impressive," he says. "The smoke was like a wall."

Most homes do not require such an elaborate solution. Regardless, every home should have a carbon monoxide detector with a digital display—ideally, one on each level. If you see readings well above 10 or 20 parts per million, call a heating contractor or your local gas company to have every combustible appliance checked out. If all other causes are ruled out but high readings persist, try starting the car out of the garage. Or vent your garage by opening a window. Still having a problem? Then call in a specialist in building diagnostics.

Another winter is on its way—and as usual, hundreds of Americans will die from carbon monoxide poisoning. Thousands more will suffer from its effects, but not those who understand the danger that lurks in their garages. ■

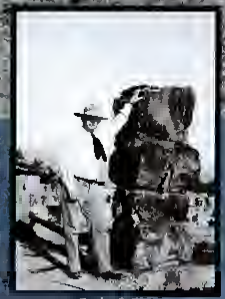
A Close Encounter

After years of wading through snow to get to her car, Andrea Leih welcomed the convenience of an attached garage when her family moved to a Des Moines suburb six years ago. But on May 13, 1995, fumes from the garage nearly killed her. Arriving home late after a softball game, she was so deep in conversation with one of her daughters that she forgot to turn off the car. She took a book to her bedroom above the garage. A few hours later, her husband heard the car running and found her unconscious—45 minutes from death, doctors said later. Whisked to Iowa Methodist Medical Center in Des Moines, she was sealed in a hyperbaric chamber, a high-pressure tube filled with pure oxygen. Because more gas dissolves in liquid at high pressure, the chamber allows plasma, the fluid part of blood, to transport oxygen to cells even if the usual carrier, hemoglobin, is tied up by carbon monoxide. Leih needed three sessions in the chamber; she returned for the picture above in hopes it might caution others. She has also taken to giving carbon monoxide detectors as wedding presents. "I know how easily an accident can happen."

The massive maroon lava boulders and redwood logs used to build Wolf House were transported by horse and wagon to author Jack London's 1,500-acre beauty Ranch near Glen Ellen, California. "When I first came here, tired of cities and people," wrote London, inset, "I settled down on some of the most beautiful, primitive land to be found in California."

WOLF HOUSE

The mansion Jack London built went up in flames before he could forsake the call of the wild



BY STEPHEN HARRIGAN PHOTOGRAPHS BY MICHAEL LLEWELLYN

"I HAVE BEEN ASKED why Jack London, socialist, friend of the common man, built so large a house," Charmian London wrote in her biography of the husband who had called her "Mate-Woman" and whom she had exuberantly called "Mate-Man" in return. "How shall I say? Jack could not traffic in small things."

When he began building Wolf House, his magnificent lair in northern California's Sonoma Valley, Jack London was at his forge it. He was the most famous writer in the world, author of *The Call of the Wild*, *White Fang*, *Martin Eden*, *The Sea Wolf* and dozens of other books that he had composed at a scrupulous lifetime quota of 1,000 words a day, as if he were still laboring in the canneries and jute mills of his Oakland youth. In 1913, the year construction on Wolf House commenced, London was

A year after the fire, the stone shell of Wolf House remained an imposing sight. Perched on the side of Sonoma Mountain, overlooking the idyllic Valley of the Moon, the four-story structure had 9 fireplaces, 26 rooms and 15,000 square feet of living space.

HISTORY © PHOTOS COURTESY JACK LONDON STATE PARKS

only 35, and though he still looks fit and tempestuously handsome in photographs from that period, he had long since worked and drank and smoked and medicated himself into ruinous health. "I would rather be ashes than dust!" he once proclaimed in a famous credo that has inspired generations of hard-living undergraduates. "I would rather be a superb meteor, every atom of me in magnificent glow, than a sleepy and permanent planet."

London couldn't afford to rebuild his dream house. Instead he built a small addition to a wood frame cottage nearby, where he lived with his wife, Charmian, until his death in 1916, three years after the fire.

And yet the truth is he planned Wolf House as a monument to permanence. The man who had been an oyster pirate on San Francisco Bay, a socialist firebrand, a gold prospector in the Klondike, a correspondent during the Russo-Japanese War and a restless wanderer in the South Seas now gave every sign of being ready to settle down as a gentleman rancher on the extensive acreage he had acquired at the foot of Sonoma Mountain. "I am really going to throw out an anchor so big and so heavy that all hell could not ever get it up again," he declared.

He was going to build a house that would last, he said, for a thousand years. Working with San Francisco architect Albert Farr, he conjured up a gnarly, rugged domicile of volcanic boulders and unpeeled redwood logs, with thick concrete walls on the inside to discourage the spread of fire and a deep, strong foundation to anchor the structure against earthquakes.

The house was built around a central courtyard, which featured a reflection pool that was to be stocked with mountain bass. Though Charmian had commodious "apartments" on the third floor, most of the other rooms in the house were a testament to the manly vigor and caged-beast working habits of its creator. There was a gun and trophy room, a manuscript vault, a huge library where all the books London had accumulated in his rootless life would finally find a home, and an equally expansive writing room on the third floor. A two-story living room commanded the northwest wing of the house, but where London really meant to entertain his male guests was a hideout on the first level he christened the Stag Party Room. Finally, London—who was too restless, too untamed and too much of a snotter to share a room with any woman, even the redoubtable Charmian—built himself a personal "sleeping tower" that perched all alone above the roof of the third floor like an eagle's aerie. "It should be thought of, that house," Charmian wrote, "in relation to Jack, not as a mansion, but as a big cabin, a lofty lodge, a hospitable tepee, where he, simple and generous despite all his baffling intricacy, could stretch himself and beam upon you and me and all the world that gathered by his log-fires."

Wolf House took two years to build, at a price of $80,000. On the afternoon of August 22, 1913, Jack and Charmian went horseback riding along a ravine at the ranch and looked down at the red tiled roof of the great house. It was all but finished. Little remained but for the workmen to clear the debris of construction and for the Londons' heavy custom made furniture to be delivered. In only a few weeks they would move in.

"How beautiful—our house, Mate Woman!" Jack said to Charmian as they sat on their horses contemplating the building they expected would serve as their home and headquarters for the rest of their vigorous lives.

But near midnight of that same day, neighbors noticed a strange glowing presence in the direction of the Londons' ranch. Jack and Charmian were awakened at their cottage, half a mile away from Wolf House. By that time flames and smoke were rearing high into the night sky. Jack had the horses harnessed so they could drive to the fire, but Charmian remembered his lack of urgency. "What's the use of hurry?" he said. "If that is the Big House burning, nothing can stop it now!"

Jack and Charmian, who had made a two-year voyage across the South Pacific before settling permanently at Beauty Ranch, donned tropical headdresses for a party not long after ground was broken for Wolf House.

In a matter of hours Wolf House was destroyed. Only a smoking shell of concrete and ruddy volcanic rock remained. London did not seem at first to be deeply affected. He occupied himself with trying to calm the anguished foreman, who kept crying "My child! My child!" as the house burned, and in raising the spirits of distraught workers and friends who had gathered to witness the conflagration. To at least one neighbor, it seemed that the strangely cheerful London didn't fully grasp what had happened to him.

It was not until four in the morning, when Jack and Charmian had returned to their cottage and were lying in bed, that the full realization finally descended. "He lay in my pitying arms," Charmian reported, "and shook like a baby."

THE RUINS OF WOLF HOUSE are preserved today as the centerpiece of Jack London State Historical Park, about an hour's drive north of

San Francisco in a wine-growing pocket of Sonoma County known as the Valley of the Moon. The park incorporates a good deal of London's ranch, including the cottage where he and Charmian lived, the barns and silos and pippens that were the heart of the ranch economy, and the impounded lake at the summit of a redwood-covered hill that the Londons used for recreation. But it's a good bet that most visitors to the park are less interested in acquainting themselves with Jack London's agricultural techniques and visions than they are in seeing the remains of the house he planned and built and dreamed of, but that finally slipped from his grasp at the moment he reached out to possess it.

A copper urn wreathed with primroses and bearing London's ashes was placed in a concrete box at a hilltop grave, then covered with a fourton block of lava to discourage grave robbers.

The path from the parking lot leads pilgrims from grassy meadows into a forest as cool and somber as a medieval vault. The bright velvety lichen covering the trunks of the live oaks almost glows in this subdued light, as does the lurid orange bark of the madrona trees. There are towhees in the underbrush, and woodpeckers flying above them, and red tailed hawks intermittently visible overhead through gaps in the forest canopy.

You come upon Wolf House sooner than you expect to, after about a half-mile of easy walking. The ruin does not crown a commanding promontory but sits almost hidden in the primeval shade of a redwood grove. It is massive, of course, and eerie, but strangely not decrepit. Its powerful superstructure of red volcanic boulders appears sturdy enough that the house could be rebuilt tomorrow. At first glance, it is merely a jumble of towering rock and hollow space, but even a brief acquaintance with the blueprints of Wolf House will allow you to pick out the areas where the great rooms briefly existed. The site of the Stag Party Room is plainly visible, as is the towering living room above it and the empty concrete pond that dominated the courtyard. What is most impressive about the house is not its size, however, but its insistent jaggedness. None of the volcanic boulders and cobbles that make up its exterior walls were shaped for the purpose. They were cemented into place exactly as they were blasted out of the quarry or picked up off the ground, and to this day their surfaces—weathered and covered with lichen—are startlingly sharp and irregular. It is no accident that the dream home of America's most rough hewn major writer would be this cavern of unpeeled logs and sharp rocks.

What caused the fire? The Londons came to believe it was arson, perhaps the work of socialists angered and disillusioned over Jack's sudden infatuation with paternal grandeur, or one of the neighbors with whom he was in litigation over thorny water issues. But in 1995 a group of 10 fire experts who spent four days investigating the site determined that the blaze most likely started when a pile of linseed-soaked rags, left behind by a workman on the wooden floor of the dining room, had self-ignited in the heat of that August night.

It is hard to know how hard the loss of Wolf House hit Jack London. To all appearances, he seemed to shrug it off and go on with his business. After the fire, still living in the nearby cottage, he maintained his strenuous literary output, completing another six or seven books, traveled to Hawaii and Mexico and became active in business pursuits as various as grape juice and motion pictures. But, according to Charmian, "the razing of the house killed something in Jack and he never ceased to feel the tragic inner sense of loss."

"I'm going to live a hundred years!" he declared to his wife one robust morning not long after the fire. But he didn't, no more than his house lasted for a thousand years. By November of 1916 his kidneys, ravaged by years of disease and abuse, had pretty much stopped functioning, and the lean smoldering appearance that had helped to fix his legend in his readers' minds was gone as well. His body was bloated with the effects of uremia, and his eyes were haunted.

He was 39 when he fell into a coma one night on the sleeping porch of his cottage. Four physicians rushed to the ranch, but they could not revive him, nor could Charmian, who shook him by the shoulders and shouted into his face: "Mate! Mate! You must come back! Mate! You've got to come back! To me! Mate! Mate!"

He was cremated and his ashes buried on a hilltop at the ranch. There was no ceremony. No one said a word as the urn was placed into the ground. Charmian and the other mourners simply stood in silence as a light rain fell. Then a heavy red boulder from Jack London's ruined house was dragged up the hill by a team of horses and rolled on top of his grave. ■

FOR SOURCES, SEE DIRECTORY - PAGE 191

Every year, some 80,000 visitors hike through a forest of oaks, madrones, California buckeye, Douglas fir and coastal redwoods to visit the ruins of Jack London's mansion. The walls have been reinforced with steel bars and capped with concrete to help keep the structure from crumbling.

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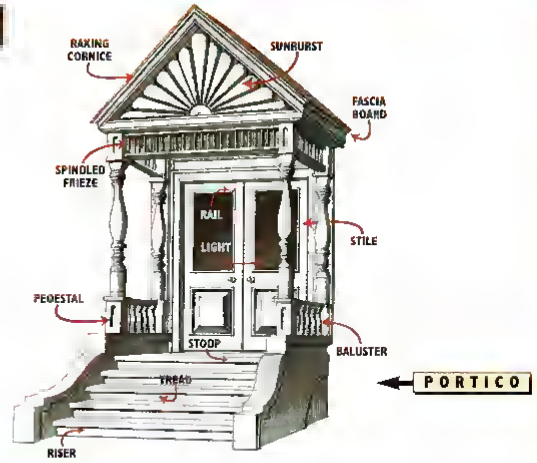
THE POSTER



ARCHITECTURAL DETAILS

The enchantment of an old house is in the details. That lakeside cottage your mother's family once lived in has burned itself into memory as sparkling lattice windows, porch balusters and a balcony with French doors. The grand old Victorian down the street always catches your attention because it's dense with eyebrow dormers, fish-scale shingles and scroll-sawn brackets. Staring out your bedroom window, you can meditate on a sea of gables, corbelled chimneys, turret tops and finials—if you're lucky. Details are disappearing fast. They take time to design, they're expensive to build and they need a lot of maintenance. Instead of lattice windows, we now get [illegible] flashing sunfires now only manages a single, flat reflection. Perhaps it's time to recapture the magic by adding old-fashioned details to your house. But first, you'll have to know what to ask for. Open the poster to learn the names of the details that once made houses so memorable.

BY CRAIG KELLOGG

DETAILS ON THE DETAILS

APRON
Panel or wide trim under a windowsill.

ARCHITRAVE
Beam running on top of a row of columns, also, moldings around doors and windows.

BALCORET
Decorative railing that runs across the lower portion of a window

BALUSTER
Vertical element—wood or masonry—under a handrail

BALUSTRADE
Assembly of *balusters* and handrail.

BARO
Horizontal decorative element, often used to indicate floor levels.

BARGE BOARO
Decorative or plain trim attached to the eaves of a gable

BELCAST EAVES
Slight curvature or flaring, near the bottom of a roof slope

BELVEOERE
Open rooftop pavilion

BRACKET
Supporting brace under eaves or other projecting elements.

BULL'S EYE
Oval or round window opening

COLORETTE
Short, slender and usually decorative column.

CONICAL ROOF
Cone-shaped structure over a round tower or *turret*

CORBEL
Ornamental block that supports a beam or other element.

CORBELLIRG
Masonry course that steps out further than the one below

CORRER BOARDS
Mitered or butted vertical trim at the junction of two walls

CORNICE
Moldings along the top of a wall.

COUPLEO WINDOWS
Matched pair of windows separated by a *mullion*

OERTIL
Molding composed of equally spaced rectangular blocks; from the French for teeth.

EAVES
Part of a roof that extends beyond the plane of the wall

ERGAGEO COLUMN
Partial column connected to a wall.

EYEBROW
Dormer-like roof projection with a window or vent and a curved top

FARLIGHT
Semicircular window with radiating *muntins*, often placed over a door or window

FASCIA BOARO
Trim covering rafter ends at the end of a roof pitch.

FINIAL
Pointed wood or metal ornament at the peak of a roof

FRENCH OOORS
Pair of identical glass-paned doors.

FRENCH WINOOW
Pair of identical casement windows with no dividing *mullion*

FRETWORK
Intricate cutouts in a panel or other decorative element.

FRIEZE
Decorative band or board between a *cornice* and an *architrave*

GABLE DORMER
Gable-ended structure with a window that projects from a roof

GABLE VENT
Louvered opening at or near the peak of a gable

GABLET
Roof of a small *gable dormer*.

HIP KROB
Decorative element on a roof peak, similar to a *finial*, but topped with a spherical or pineapple shape.

HOOO
Shallow overhang above a door or window

IMBRICATION
Decorative patterns in wall or roof shingles.

KEY BLOCK
Tapered decorative element in a round or oval frame; also, central structural piece of a masonry arch (keystone).

LANCET WIROOW
Sash with a pointed, arched top

LATTICE WIROOW
Sash divided diagonally into diamond-shaped panes.

LIGRT
Transparent portion of a window; also, single pane of glass.

MEETIRG RAIL
Top member of lower *sash* and bottom member of upper *sash* in a double-hung window

MODILLIOR
Horizontal, often scroll-shaped *bracket* placed under eaves and other overhangs

MULLION
Vertical structural element between two windows.

MUNTIR
Wooden bar that separates window panes.

NEWEL
Decorative structural post at either end of a stair rail.

NEWEL CAP
Decorative element atop a *newel*.

ORIEL
Curved or faceted projection from a wall, often incorporates a bay window

OVERDOOR
Fixed window or panel above a door

PALLAOIAR WIROOW
Assembly of windows in which two *lights* flank one with an arched top.

PARAPET
Low wall or barrier railing at a balcony or roof edge.

PEDESTAL
Support block under the base of a column.

PEDIMENT
Triangular projection from a roof or from the top of door or window

PEROANT
Ornament that drops below an overhang or projection

PIER
Load-bearing element that rises from a footing

PORTICO
Small porch with a roof supported by columns or posts.

QUOINS
Decorative corner treatment made of wood or veneer masonry that simulates large rectangular stones.

RAFTER TAIL
Part of the rafter that extends beyond the wall

RAIL
Horizontal structural member of a door or *sash*

RAIRWATER HEAO
Basin at the top of a downspout that collects water from a gutter

RAKIRG CORRICE
Molding that follows the slope of a *pediment* or gable

RIOGE CRESTING
Ornament along a roof ridge

RISER
Vertical part of a stair step.

SASR
Window element consisting of glass in a wood or metal frame

SOFFIT
Exposed surface under a roof overhang or other element.

SPINOLEO FRIEZE
Band of spindles attached under the eaves of a porch

STILE
Vertical structural member of a door or *sash*

STOOP
Platform or landing of a *portico*.

STRIRGCOURSE
Masonry or wood band along a wall or around a column or chimney

SUNBURST
Wooden ornament resembling rays radiating from the sun.

TRARSOM
Window or panel, usually operable, above a window or door

TREAD
Horizontal part of a stair step.

TURRET
Curved projection with windows, often topped by a *conical roof*

TYMPANUM
Recessed, triangular face of a *pediment*.

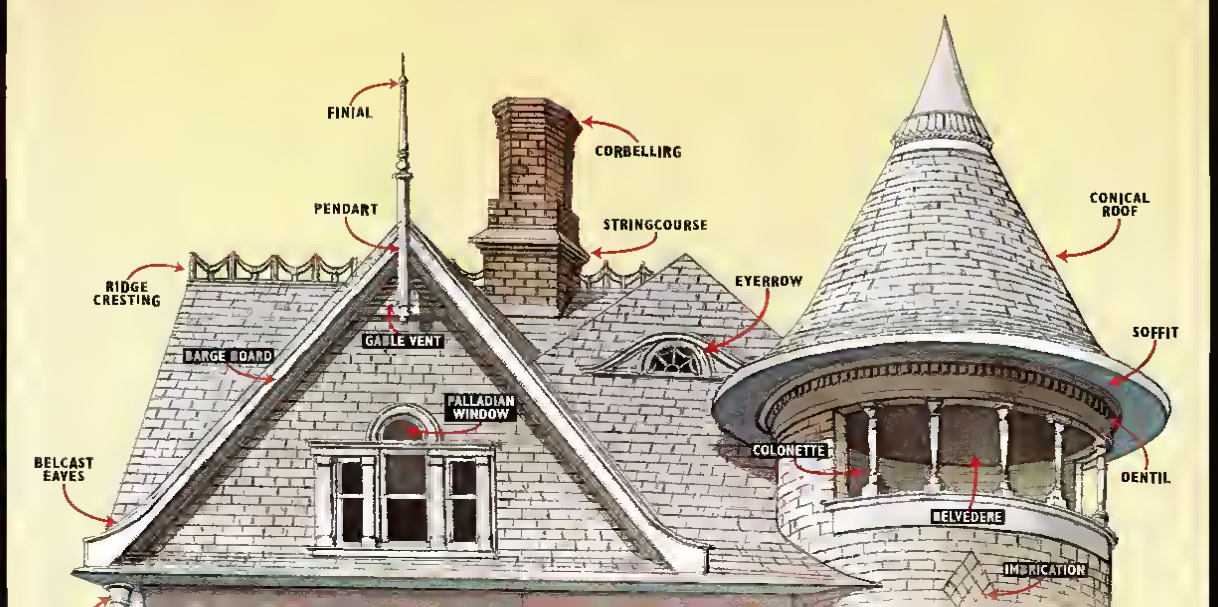
WATER TABLE
Horizontal drip-edge that prevents water from running down a wall.

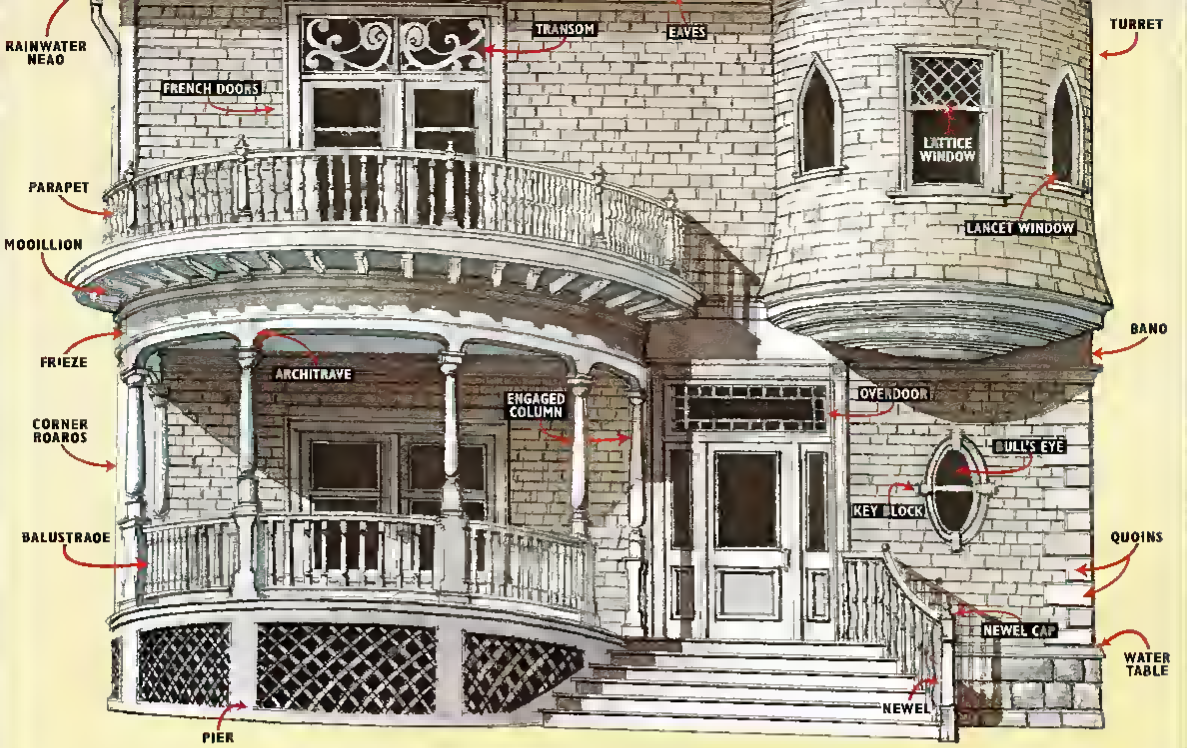
DETACH HERE

This Old House

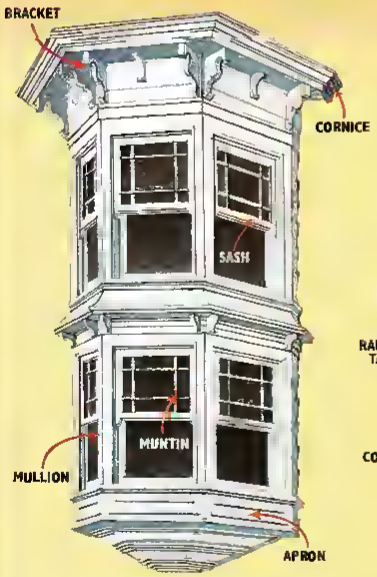
ARCHITECTURAL DETAILS

NAMES EVERY BUILDER ONCE KNEW



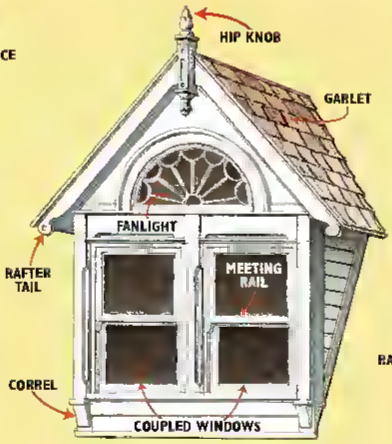


WINDOW DETAILS



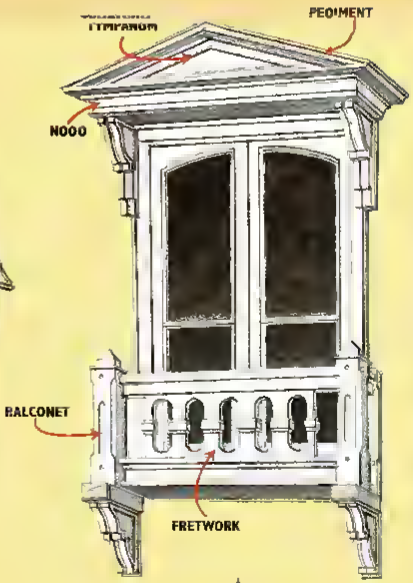
ORIEL

Usually found on English Tudor and Victorian style houses. The cantilevered bay adds light and floor space as well as dramatic peripheral views.



GABLE DORMER

A common builder's trick to extend usable space under a roof. Makes a 1½-story house into a 2-story and is itself an interesting element.



FRENCH WINDOW

Floor to ceiling casements need a protective roof to keep rain out. A small barrier is necessary to keep the absent-minded from stepping into thin air.

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BY WILLIAM G. SCHELLER

ABOVE: Garden railroads come alive with details that can be built from kits, often plastic so the buildings aren't damaged by rain and snow. ABOVE RIGHT: Snow-growing junipers and a center-chimney Colonial embellish the Watsons' Maine line.

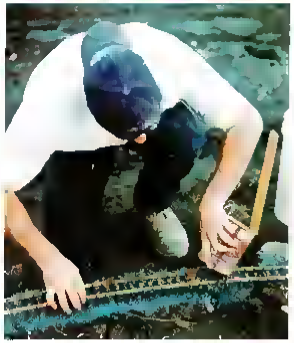
THE SHRUBBERY EXPRESS

Is a garden railroad better than a swimming pool?

Rich and Joan Watson and their 7-year-old son, Mason, have been buying heavily into the Sandy River & Rangeley Lakes Railroad. They aren't at all daunted that the narrow-gauge railroad in western Maine has been defunct since 1936. The Watsons are garden railroaders, and their scale-model empire comprises about 250 feet of track, along with locomotives and cars decked out in the maroon and deep green color scheme of the SR&RL, just off the patio behind their home in Harvard, Massachusetts.

"Some people put in a pool. We put in a railroad," says Joan, a specialist in faux finishes and decorative details. "Our idea right from the start was to have a family-oriented hobby. It's

PHOTOGRAPHS BY DAVID BARRY



not one of those things that you set up and then tell kids they can't touch. Mason spends as much time with it as we do—he's been crazy about trains since he was eighteen months old."

As a hobby, garden railroading dates back about a hundred years, to British rail aficionados who laid track and ran diminutive steam driven trains on their estates. Often those railroads were big enough to carry passengers on open cars, and a few garden trains still are. Ride-on steam, however, has always appealed more to 19th century technology buffs than to family hobbyists. "It's a separate hobby," says George Konrad, a rail historian and model maker in New Hampshire. "It's more like having an airplane."

The little trains favored by most garden railroaders are similar to indoor model trains, although larger. While indoor railroaders work entirely in the realm of artifice, constructing not only trackside buildings but also landscape features from modeling materials, their garden-railway counterparts incorporate natural elements—rocks, soil, even live plants—into layouts that resemble real life, merely shrunk.

This type of garden railroading began about 30 years ago, when the German company Lehmann began producing its LGB line of waterproof electric engines. According to Ralph Williams, the Massachusetts landscape designer who planned the Watsons' layout, the hobby first hit the United States on the West Coast. "California still has some of the most extensive layouts," Williams says, "but it's been growing by leaps and bounds all over the country." The magazine *Garden Railways* nearly doubled its circulation last year. It and at least two other magazines devoted to the hobby are far with advertising from Marklin, Aristo Craft and a few other companies that also make electric trains for the garden, and from a host of small builders that make steam locomotives. Along with the rolling stock come depots, houses, farm animals, barrels, hydrants, shov

ABOVE: *Ralph Williams surveys a week's work on the Watson family's 1,200-square-foot layout. A hand pump and soapstone sink, formerly in their kitchen, add a water feature. Trees include miniature Scotch pine, Alberta spruce and dwarf Japanese white pine.*

TEST: *On the Watsons' layout, fasteners held tight with set screws secure sections of rail. Cleta Blevins, who helped with landscaping, packed tiny rocks underneath the tracks. Then he checked for smoothness with a Sandy River engine.*

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Some garden railroaders are fanatical about keeping everything in a layout to scale, usually one inch to 22½ real-life inches. But from the perspective of an ant—at least, there's wide latitude. Even the Watson family's own house does not dwarf the engine.

The king of make-believe, Walt Disney, was so fascinated by miniature trains that he asked his studio machinists to build this one-eighth-scale steam locomotive, shown in 1951. To circumvent his wife's flower garden, he built part of the track in a long, curved tunnel—his first dark thrill ride. When Disneyland was built, this engine became the model for the park's first locomotives.

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els and even hobos from dozens of tiny companies.

Thus equipped, the models are strikingly authentic, tootling along on brass tracks laid over real gravel ballast, crossing miniature waterways on wooden trestles, switching electrically from main line to spur and even running in multiple units while deck chair Vanderbilts manage every move with radio controls.

"We even run ours in the rain," Joan Watson says. "We can use the remote from the kitchen or the porch and shunt the locomotive and cars straight through an open window into the basement," which serves as their train shed. Deliverymen ask the Watsons to run the trains out for a circuit of the looping, multilevel layout, and, Joan reports, "Everyone asks if they can bring their kids over."

In the hobby's early days, many models looked like Alpine narrow-gauge equipment—no surprise since most of the trains were made in Germany. But today, many models replicate the engines and cars used on specific U.S. roads.

Nearly all garden railroads are built to 1 Gauge, also known as G Scale, which measures 45 mm (about 1¾ inches) between the rails. (By comparison, O Gauge tracks, the old Lionel indoor standby, have rails 32 mm apart.) Historic American narrow-gauge trains ran on rails three feet apart. With each inch of the models representing 22½ real-life inches, a 30-foot narrow gauge boxcar shrinks to 16 inches in the garden.

Some manufacturers offer garden size models of American standard-gauge trains, which ran on tracks four feet, eight inches apart. To make these trains work in G Scale, manufacturers build the cars to ½₂ scale. Proportions are thrown off when they are mixed

Motive Power

Garden railroads, like real trains, have three basic forms of power: The most popular locomotives are electric, just like the Lionels that run around Christmas trees. Household current goes through a transformer and onto tracks as 12- to 18-volt DC. It can tingle fingers but not hurt you or your kids. Some electric trains carry batteries for power. Steam is popular with traditionalists. Scale-model locomotives run according to the simple principle of building a fire, boiling water and using the resulting steam to push pistons connected to drive wheels. In most garden versions, the fuel is butane, although alcohol- and pellet-fueled models are also available. A few purists even burn coal. Diesel-electric, the most common power system for full-size American locomotives, is rare. In models, an internal combustion engine running on the "glow fuel" used in model airplanes generates electric power for axle-mounted DC traction motors. Except for the special fuel, that's exactly how Amtrak would get you from New York to Chicago.

LEFT: George Konrad fills his steam engine's boiler with hot water from a tea kettle to conserve fuel and save time. ABOVE: A steam fan's reward.

with narrow gauge stock and layout elements, but, usually, only purists will notice and care. Everyone else will simply marvel at a world where 11-foot chipmunks scurry across the tracks and tulips tower like sequoias.

The cost of such fantasy is high. A starter kit with a transformer, electric locomotive, two cars and enough track for a circle a little over four feet in diameter costs about $300, but costs can exceed $5,000 or more just for a locomotive. It's hard to pin down the top end of costs for miniature locomotives that run on steam because the most elaborate and accurate of them are hand-built.

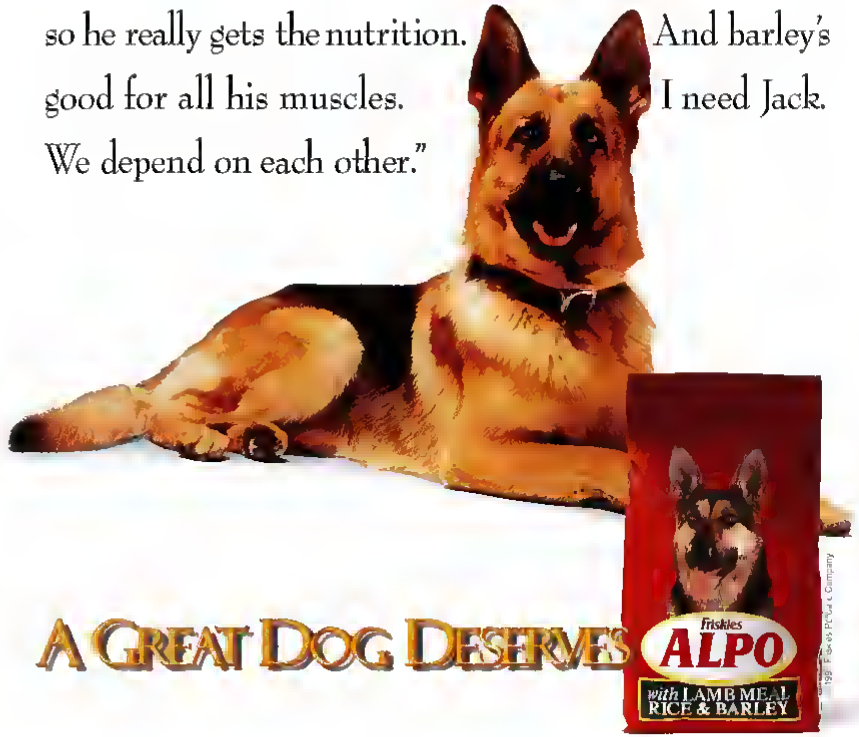
If a layout is large and complex, homeowners may hire a professional to integrate it into a garden design. The Watsons paid Williams $12,000 to plan, buy, build and install their track and its landscaping. (They already owned their three trains.) Williams says that most of his installations cost $4,000 to $20,000, with about half that often tied up in equipment.

But an outdoor railroad layout also makes a great family project. Two key guidelines come straight from the realm of real railroads: Don't exceed practical grades, and don't make turns too tight. The big roads don't like to exceed a 2 percent grade—that's two feet of elevation for every 100 feet of track. Backyard railroaders should hold to the same limits. A 3 percent grade will sharply decrease the number of cars that a locomotive can pull. Grade calculations are important when you're sizing up the lay of the property and planning clearances for crossovers.

As for turns, the rule is simple: Don't make curves tighter than a two-foot radius. That's why beginner kits operate on a circle only slightly larger than four feet in diameter.

Tracks are sold in ready-made sections or as pieces of brass rail to be attached to the strips—the less expensive and more creative route for large gardens. The brass is curved as needed with a hand-operated device called a rail bender. Many mod

"Jack is my partner. And he's my friend. They expect us to be in shape, so we work on it all the time. The part he likes best is dinner. I give him the Alpo with lamb meal, rice and barley. Our vet says rice is easy to digest, so he really gets the nutrition. And barley's good for all his muscles. I need Jack. We depend on each other."



A GREAT DOG DESERVES

Historic Trails

The difference between a garden railroad and the real thing isn't always obvious. Remnants of some historic lines survive today as tourist amusements only slightly larger than ride-on models.

The Watsons' Sandy River & Rangely Lakes setup commemorates a line that ran over rails just two feet apart, a feature popular in Maine, because laying the narrow track required less earth-moving. "These were Class 1, honest-to-God railroads," says George Konrad, a garden railroader in New Hampshire. "They did everything."

The Sandy River, shown above in 1925, hauled passengers, general freight and lumber for toothpick mills in the Western Lakes region. Passenger cars were seven feet wide, with one seat on either side of a narrow aisle. Passengers sat out beyond the rails, "making twenty miles per hour seem sixty," according to a history of the line.

When the Sandy River closed in 1936, a Massachusetts cranberry grower, Ellis D. Atwood, bought much of the equipment and used it to help move his crop. Dubbed the Edaville Railroad, the train and its 5½-mile track in South Carver became a tourist attraction. The line closed a few years ago, but the train is still running—at the Maine Narrow Gauge Railroad Museum in Portland.

elers thread the rails onto plastic ties, but purists actually spike the brass onto wood.

When it comes to laying track, Konrad says, "the way the railroad does it works best." That means putting down ballast—for model railroads, gravel smaller than quarter-inch playground stone but coarser than sand. Wherever the tracks will run, dig a trench six inches across, make it three inches deep in sandy soil, six inches in clay. Fill the trench with the gravel. When the track is in, add more gravel between the ties and tamp it down.

Surprisingly, weatherproofing is a minor concern. Only the transformer must be kept out of the rain. Even snow is no deterrent. Many of Williams's clients, including the Watsons, run trains through scale-model winter wonderlands, just as Williams does at his own display layout at Weston Nurseries in Hopkinton, Massachusetts. Although you can sweep tracks of snow or fallen leaves with a broom, Williams uses a locomotive custom equipped with an old paintbrush to clear away light debris. For removing tarnish—electric trains depend on a good contact between wheel and track—he recommends using a Scotchbrite pad mounted on a swivel tipped drywall-sanding pole or buying a track-cleaning car that polishes as it makes contact with the rails.

But all these technical details ultimately take a backseat to the romance of the rails. "Our Sandy River steam locomotive has a working headlight," says Joan Watson, "and there's a little red light on the back of the caboose. There's nothing neater for us than watching the train run at dusk." ■

Seven-year-old Mason Watson surveys his backyard realm

HISTORIC PHOTO COURTESY OF BOOTH BAY RAILWAY VILLAGE

FOR SOURCES, SEE BIBLIOTORY—PAGE 191

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● Indicates *This Old House Classics*: vintage episodes rebroadcast on commercial stations

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WKMR TV
Mon 6:30 pm Sun 5 pm

Murray
WKMU TV
Mon. 5:30 pm, Sun. 4 pm

Owensboro
WKOH TV
Mon 5:30 pm Sun 4 pm

Owenton
WKON TV
Mon. 6:30 pm, Sun. 5 pm

Paducah
WKPD TV
Mon 5:30 pm, Sun 4 pm
● KUSI TV
Sat 10:30 pm

Pikeville
WKPI TV
Mon 8:30 pm, Sun. 5 pm

Somerset
WKSO TV
Mon 6:10 pm..Sun. 5 pm

LOUISIANA

Alexandria
KLPA TV
Sat 4 pm, Sun. 10 am

Baton Rouge
WEPR TV
Sat 4 pm Sun 10 am
● KWBJ-TV
Sun. noon

Lafayette
KLPB-TV
Sat 4 pm Sun 10 am

Lake Charles
KETL TV
Sat 4 pm, Sun 10 am

Monroe
KETM TV
Sat. 4 pm, Sun 10 am

New Orleans
WYES-TV
Sat 5:30 am
● WVUE
Sun 6 pm

Shreveport
KETS TV
Sat 4 pm Sun. 10 am
● KTBS*

MAINE

Bangor
WMEB-TV
Sat 1:30 pm

Calais
WMED-TV
Sat 1:30 pm

Lewiston
WCOU-TV
Sat 1:30 pm

Portland
WMEA TV
Sat 1:30 pm
● WMEA-TV
Sun. 11 am

Presque Isle
WMEM TV
Su 1 10 pm

MARYLAND

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Sat. 4:30 pm, Sun. 6:30 pm

Baltimore
WMPB-TV
Sat 4:30 pm, Sun 6:30 pm
● WMAR-TV*

Frederick
WFPT TV
Sat 4:30 pm Sun 6:30 pm

Hagerstown
WWPB-TV
Sat 4:30 pm, Sun 6:30 pm

Oakland
WCPT TV
Sat 4:30 pm, Sun 6:30 pm

Salisbury
WCPB TV
Sat 4 10 p.m..Sun 6 30 pm

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WGBH TV
Thu 8 pm, Sat. 5:30 pm
WGBX TV
Sun 9 am
● WFXT TV
Sun 11 am

Springfield
WGBY TV
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MICHIGAN

Alpena
WCME TV
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Sun. 5 pm

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● WOOD/WOTV TV*

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Lansing
● WILX TV
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Sat 2:30 pm

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WNMU-TV
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Sat 2:30 pm

University Center
WUCM TV
Thu 10:00 pm, Sun 5 pm

MINNESOTA

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KSMN
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KWCM TV
Sat 12:30 pm, Thu 8 pm

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Sat 12:30 pm, Sun 7 pm

Bemidji
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Sat 12:30 pm

Brainerd
KAWB-TV
Thu. 7:30 pm
Sat. 12:30 pm

Duluth
WDSE-TV
Sat 6:10 pm, Sun 9:30 am

Rochester
● KAAL-TV
Sat 6 am

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KTCA-TV
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KTCI TV
● KSTP TV
Sun 11:30 am

MISSISSIPPI

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Sat 7 pm

Booneville
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Oxford
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Sat 7 pm

MISSOURI

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● KRCG TV
Sun 11 am

Joplin
● KOAM TV
Sun 6 am
KOZJ TV
Sat 12:10 pm

Kansas City
KCPT TV
Thu. 7:30 pm
Sat 12:30 pm
● KMBC TV
Sat 6:30 am

St. Louis
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Wed. 12:30 pm
Sat. 6:30 pm
● KTVI TV*

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Sat 12:30 pm

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Sun 11 am

MONTANA

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Missoula
KUFM TV
Sat 11 10 am

NEBRASKA

Alliance
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Sat 10 am and 5:30 pm

Bassett
NETV TV
Sat. 10 am and 5:30 pm

Hastings
NETV TV
Sat 10 am and 5:30 pm

Lexington
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Sat. 10 am and 5:30 pm

Lincoln
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Sat 10 am and 5:30 pm
● KHAS-TV
Sat 5 pm

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Sat 10 am and 5:30 pm

Norfolk
NETV TV
Sat 10 am and 5:30 pm

North Platte
NETV TV
Sat 10 am and 5:30 pm

Omaha
NETV-TV
Sat 10 am and 5:30 pm

NEVADA

Las Vegas
KEVX TV
Sun 6 am, Tue 9 pm
Sat 9 am and 12:30 pm
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Sun 8:30 am

Reno
KNPB-TV
Sat. 10:30 am, Sun. 5 pm
● KAME-TV
Sat 11 a m

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WENH TV
Thu. 8:30 pm, Sun. 10 am

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WEKW TV
Thu 8:30 pm, Sun 10 am

Littleton
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Manchester
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Sun 8 am

NEW JERSEY

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WNJS-TV
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Sun 5:30 pm

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Thu 8 pm Sat 8 pm
Sun 5:30 pm

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Thu. 8 pm, Sat. 8 pm
Sun 5:30 pm

Trenton
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Sun 5:30 pm

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Albuquerque
KNME TV
Thu 7 pm, Sun. 10 am

Las Cruces
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Sat 11:30 am

Portales
KENW-TV
Sat 3:30 pm
Wed 11 10 pm

NEW YORK

Albany
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Sun 10 am

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Sat 8 am, 1:30 pm
and 6 10 pm, Sun 7 am
● WBNG TV
Sat 7:30 am

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WNED-TV
Sat 10:30 am
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Sun 7 pm
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Sun. 8:30 am

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● WYDC-TV*

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Sat 5:30 pm
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Sun. 7:30 am

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Sat 10:30 am

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Sun 11:30 am

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Sat 10:30 am, Sun 5:30 pm
● WHEC TV
Sun 6 am

Schenectady
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Tue. 1:30 pm Sat 10:30 am

Syracuse
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Sat 10:30 am
● WSTM TV
Sun 6 am

Watertown
WNLE TV
Sat 10:30 am

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Chapel Hill
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Sat 5:30 pm, Thu 8 pm

Charlotte
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Sun 11 am
WUNG-TV
Sat 3:30 pm, Thu. 8 pm
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Sat 7 10 pm Sun 1 30 pm

Columbus
WUND TV
Sat. 3 10 pm Sun 8 pm

Greensboro
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Sat 6 30 am

Greenville
WUNK TV
Sat 5 30 pm, Thu 8 pm
● WEOS/WEBC TV
Sat. 10 am

Jacksonville
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Sat 5:30 pm Thu 8 pm

Louisville
WUNE TV
Sat 5 30 pm, Thu 8 pm

Lumberton
WUND-TV
Sat 5 30 pm, Thu. 8 pm

Raleigh
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Sun 11 30 am

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Sat 5:30 pm, Thu. 8 pm

Wilmington
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Sat 5 30 pm Thu 8 pm

Winston-Salem
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Ellendale
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Thu 7 pm, Sat. 6 pm

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Thu 8 pm
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This Old House CLASSICS

Program Guide

Taking On the 19th Century

Norm and Steve begin basic restoration of a classic 1815 home in Wayland

Week 24 (August 30-31)

Work continues on the New Orleans project house. While owner Jean Golden scrapes paint off the facade, Steve Thomas visits an architectural salvage yard to pick up missing porch details. Kitchen design begins, and Richard Trethewey reviews the plumbing and heating plans.

Week 25 (September 6-7)

Masons install a brick walkway in front of the house. Inside, Norm Abram shortens a kitchen window to accommodate the new counters. The Goldens choose a bold Victorian color scheme for the facade. "Melodious Mauve" and "Venice Lavender."

Lovely to look at. Kirkside had rotted sills, a leaky roof, and a sunlight-deprived kitchen.

Week 26 (September 13-14)

Although all the interior renovations aren't yet completed, Norm has installed the kitchen, and the longleaf yellow pine floors have been refinished. With a jazz band playing, the crew says adieu to New Orleans.

Week 1 (September 20-21)

The 13th season begins in Wayland, Massachusetts, with the renovation of Kirkside, an 1815 house once used as a general store and town meeting hall. After a tour, which includes the cavernous "great meeting room" decorated with century-and-a-half-old French wallpaper, Norm tells owners Jean and Chris Hagger that basic improvements will consume the lion's share of their $200,000 budget.

Week 2 (September 27-28)

Norm and Tom Silva get to work on the roof. A consultant from the Society for the Preservation of New England Antiquities uses an architectural model to show Chris Hagger how the house evolved and how best to restore it. Out back, excavators dig test holes to determine placement of the septic system.

Week 3 (October 4-5)

Tom installs the new asphalt shingle roof, and a preservation mason examines the fireplaces. Steve follows the dumpster trail to a recycling facility for discarded construction materials.

Week 4 (October 11-12)

Norm removes the front porch columns in preparation for restoring the portico to its 1888 appearance. Chris and design consultant Jock Gifford devise a plan for reconfiguring the kitchen and master bathroom. The president of the Wayland Historic Commission reviews local preservation guidelines and shows off the historic district's newest house, built in 1886.

Week 5 (October 18-19)

Chimney specialists demonstrate the art of flue installation and maintenance. Norm uses epoxy on the sill to repair rotted wood and prevent insect and water damage.

Norm and Steve wouldn't dream of changing the 150 year-old French wallpaper, with its scenes from nature.

Week 6 (October 25-26)

Preservation consultant Greg Clancey begins investigating the color of the house in 1885. Undeterred by rain, the Silva brothers pick up the western façade and replace rotted sills. Richard Trethewey dismantles the cast-iron boiler and prepares for the transition to gas heat.

Next episode

Portico reconstruction, landscape improvements, asbestos removal, skylight installation, and a lesson on modern day septic systems.

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Sat. 10:30 am, Thu. 8 pm

La Grande
KTVR-TV
Thu. 8 pm, Sat. 5 pm

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● KOBI/KOTI TV
Sun. 4 pm

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● KATU TV
Sun. 5:30 pm

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Sat. 6:30 am

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Sun. 11 am

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Sun. 9 am

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Eagle Butte
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KQSD-TV
Sat. 4:30 pm

Marion
KZSD-TV
Sat. 3:30 pm

Pierre
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Sat. 4:30 pm

Rapid City
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Sat. 2:30 pm
● KCLO-TV
Sun. 10 am

Sioux Falls
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● KFLO TV
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WSJK TV
Sat. 1:30 pm
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Sun. 5:30 am

Lexington
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Memphis
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● WKRN TV
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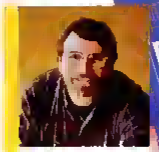

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A Guide to Resources for the Classics TV Series

During the 1991-1992 television season, the crew completed renovation of a double shotgun in New Orleans and started work on Kirkside, an 1815 house in Wayland, Massachusetts. The following is a list of some of the suppliers and manufacturers featured on those shows. (Information was correct as of the date the programs were originally broadcast.)

Week 24

Plumbing materials: Southland Plumbing Supply, 2321 N. Amoult Road, Metairie, LA 70001, 504-835-6411. **Other plumbing assistance:** National Association of Plumbing-Heating-Cooling Contractors, 180 South Washington St., Box 6808, Falls Church, VA 22046, 800-533-7694. **Plumbing fixtures, tubs and sinks:** Eljer Industries, 901 10th St., Plano, TX 75074, 214-578-3428. **Fiberglass shower surround:** Swan Corp., 406 Olive St., St. Louis, MO 63102, 800-325-7006. **No-scald shower regulator:** Symmons Industries, 31 Brooks Drive, Braintree, MA 02184, 617-848-2250. **Water heater:** A.O. Smith Corp., 5505 N. MacArthur Boulevard, #360, Irving, TX 75038, 214-518-1390. **Heat pump:** Lennox Industries International, 2100 Lake Park Blvd., Richardson, TX 75080, 214-497-5000. **Kitchen planning software:** Planit USA, 1921 Corporate Square, Slidell, LA 70458, 800-272-5533.

Week 25

Paints: Sherwin Williams Classic 99 provided by Sherwin Williams, 3634 General Meyers Ave., New Orleans, LA 70114. **Woodmould brick pavers:** St. Joe Brick Works Inc., Box 400, Slidell, LA 70459, 504-863-6161.

Week 26

Interior design and furniture: Ethan Allen by Lafayette's Carriage House, 1010 Behrman Hwy., Gretna, LA 70056, 504-368-1010. **Floor refinishing:** Treandle Floor Co. Inc., 8505 Oak St., New Orleans, LA 70118, 504-861-6117/8. **Water-base polyethylene floor finish:** Safe and Simple, Parks Corp., Box 5, Somerset, MA 02726, 800-225-8543. **Professional sandpaper:** 3M Co. **Kitchen cabinets:** StarMark Inc., Box 94610, Sioux Falls, SD 57118, 605-335-8600. **Kitchen countertops:** Wilsonart, 600 General Bruce Drive, Box 6110, Temple, TX 76503, 817-778-2711. **Appliances:** KitchenAid, 701 Main Street, St. Joseph, MI 49085, 1316, 616-982-4567. **Carpet:** Winstead Collection by Salem Carpet Mills, Box 703, S. Pittsburg, TN 37380-0703, 800-252-5620. **Wallpaper border:** Scalamandre, 37-24 24th St., Long Island City, NY 11101, 718-361-8500.

Week 1

Wayland Hist. Society, 617-655-8626.

Week 2

Local building supplies: Ogilvie and Sons, 37 Warren Ave., Weston, MA 02193, 617-894-1265. **Architectural conservation consultant:** Society for the Preservation of New England Antiquities, Conservation Center, 185 Lyman St., Waltham, MA 02154, 617-891-1985. **Septic system engineers:** Nelson Engineering, Box 1343, Concord, MA 01742, 508-369-8108 or 603-875-5465. Construction Services Co., 100 Gretchen St., Holliston, MA 01746, 508-429-1410. **Hick starter vent:** Robert M. Hicks Inc., 124 Main St., Westford, MA 01886, 508-692-8811. **Aerialift:** Shaughnessy Aerialifts Inc., 617-268-3000.

Week 3

Shingles (GAF Timberline Ultra), ice and water barrier (GAF Weatherwatch) and underlayment (GAF Shinglemate): GAF Building Materials Corp., 1361 Alps Road, Wayne, NJ 07470, 201-628-4124. **Ridge vent:** Roll Vent. Benjamin Obdyks Inc., John Fitch Industrial Park, Warminster, PA 18974, 800-523-5261. **Recycling facility and dumpster provider:** Jet-A-Way Waste Technologies, 47 Kemble St., Roxbury, MA 02119, 617-288-7173 ext. 236. **Rubber roof and adhesive:** Roofing Products International Inc., 29542 Manchester Drive, Elkhart, IN 46514, 800-626-2957. **Design consultant/architects:** Design Associates, 432 Columbia St., Cambridge, MA 02139, 617-661-9082. **Wayland Historic District Commission,** 508-358-7701.

Week 4

Rubber roof and adhesive: Roofing Products International Inc., 29542 Manchester Drive, Elkhart, IN 46514, 800-626-2957. **Design consultants/architects:** Design Associates, 432 Columbia St., Cambridge, MA 02139, 617-661-9082. **Wayland Historic District Commission:** 508-358-7701. Aerialift: Shaughnessy Aerialifts Inc., 617-268-3000.

Week 5

Flue dampers: Lyemance International, Box 505, Jeffersonville, IN 47131, 812-288-9953. Chimney sweeps: The Chimney Doctor, 70 Love Lane, Concord, MA, 508-369-7072. Kitchen and bath design: Acton Woodworks, School St. and Rt. 27, Acton, MA 01720, 508-263-0222.

● KFDA-TV
Sat. 5 pm

Austin
KLRU-TV
Sat. 5:30 pm
● KTBC-TV
Sat. 7 am

Beaumont
● KFDM-TV
Sun. 6:30 am

College Station
KAMU-TV
Sat. 12:30 pm, Mon. 10 pm, Wed. 2 pm

Corpus Christi
KEDT-TV
Sat. 12:30 pm, 9:30 pm
● KRIS/KOE-TV*

Dallas/Fort Worth
KERA-TV
Sat. 9 am and 6:30 pm
● KXAS/KTX-TV
Sat. 5 pm

El Paso
KCOS-TV
Sat. 5 pm

Harlingen
KMBH-TV
Sat. 12:30 pm
● KVEO-TV
Sun. 6 am

Houston
KUHT-TV
Sun. 11:30 am
● KTRK-TV
Sun. 11 am

Killeen
KNCT-TV
Sat. 12:30 pm, Sun. 9:30 am

Lubbock
KTXT-TV
Sat. 12:30 pm
● KLBK-TV
Sun. 3 pm

Odessa
KOCV-TV
Sun. 12:30 pm

San Antonio
KLRN-TV
Sat. 3:30 pm

Tyler
● KLPN-TV
Sat. 9 am

Waco
KCTF-TV
Mon. 12:30 pm
Sat. 9 am and 6:30 pm
● KXXV-TV
Sun. 11 am

UTAH

Provo
KBYU-TV
Sat. 12 pm

Salt Lake City
KUED-TV
Sat. 8 am and 5 pm
● KTVX-TV*

VERMONT

Burlington
WETK-TV
Thu. 8 pm, Sat. 12 am
● WCAX-TV
Sun. 8:30 am

Rutland
WVER-TV
Thu. 8 pm, Sat. 11 am

Saint Johnsbury
WVTB-TV
Thu. 8 pm, Sat. 11 am

Windsor
WVTA-TV
Thu. 8 pm, Sat. 11 am

VIRGINIA

Charlottesville
WHTJ-TV
Sat. 8:30 am

Falls Church
WNVT-TV
Sun. 3 pm

Harrisonburg
WVPT-TV
Sat. 1:30 pm

Manassas
WMSV-TV
Sat. 1:30 pm

Norfolk
WHRO-TV
Thu. 8 pm

Norton
WSBN-TV
Sat. 1:30 pm

Richmond
WCVE-TV
Sat. 6:30 am
WCVW-TV
Fri. 8:30 pm
● WAWB-TV
Sun. 6 am

Roanoke
WBRA-TV
Sat. 1:30 pm
● WSLS-TV
Sun. 6:30 am

WASHINGTON

Centralia
KLKA-TV
Thu. 6:30 pm
Sat. 12:30 pm and 3:30 pm

Pullman
KWSU-TV
Mon. 7:30 pm
Wed. 7:30 am, Sat. 2 pm

Richland
KTNW-TV
Thu. 7 pm
Sat. 2 pm, Sun. 4:30 pm

Seattle
KCTS-TV
Sun. 5 pm
● KIRO-TV*

Spokane
KSPS-TV
Sat. 9:30 am, Sun. 5:30 pm
● KXLY-TV
Sun. 9:30 am

Tacoma
KBTC-TV
Thu. 6:30 pm
Sat. 12:30 pm and 5:30 pm

Yakima
KYVE-TV
Sun. 5 pm

WEST VIRGINIA

Beckley
WSWP-TV
Sat. 2:30 pm

Bluefield
● WOAY-TV*

Charleston
● WCHS-TV
Sun. 6 am

Huntington
WPBY-TV
Sat. 3:30 pm

Morgantown
WNPB-TV
Sat. 2:30 pm

Wheeling
● WTRF-TV*

WISCONSIN

Green Bay
WPNE-TV
Wed. 7:30 pm, Sun. 4 pm
● WGBA-TV
Sun. 7 am

La Crosse
WHLA-TV
Wed. 7:30 pm, Sun. 4 pm
● WEAU-TV
Sun. 9 am

Madison
WHA-TV
Wed. 7:30 pm, Sun. 4 pm
● WMTV-TV
Sat. 3 pm

Menomonie
WHWC-TV
Wed. 7:30 pm, Sun. 4 pm

Milwaukee
WMVS-TV
Thu. 7:30 pm, Sat. 8 am
● WTMJ-TV
Sun. 6 am

Park Falls
WLEF-TV
Wed. 7:30 pm, Sun. 4 pm

Wausau
WHRM-TV
Wed. 7:30 pm, Sun. 4 pm
● WJFW-TV
Sun. 10:30 am

WYOMING

Riverton
KCWC-TV
Sat. noon and 5 pm

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EXTRAS
pp. 18-22

Gwydir Castle: Llanrwst, Gwynedd, Wales, UK; completion of the castle's dining room is scheduled for the summer of 1998; two bed and-breakfast rooms available, 011-44-149-264 1687

Screwheads: Courtesy of the Eazypower Corp., 4006 W. Belden Ave., Chicago, IL 60639; 773-278-5000

Our thanks to: Ira Kozak and Steve Grossman of Eazypower Corp., Chicago, Illinois.

Staplers

Sharpshooter hammer tacker PHT-150C, $28, Stanley Fastening Systems, Briggs Dr., E. Greenwich, RI 02818, 800-343-9329

Attacker T2025, $27, and ETC-50 cordless electric, $100, Arrow Fastener Co. Inc., 271 Mayhill St., Saddle Brook, NJ 07663, 201-843-6900.

Craftsman electric staple and nail gun, 68496, $30, Sears Craftsman Catalog, 2740 W. 79th St., Chicago, IL 60652, 800-377-7414

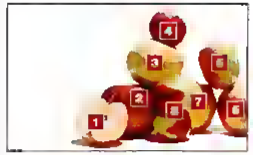
Columns: Patrick L. Pinnell AIA, Yale University, School of Architecture, New Haven, CT 06520-8242; 203-432-2286.

Architecture Book: *The Architecture Pack*, by Ron van der Meer and Deyan Sudjic, Alfred A. Knopf, 1997, $50, 201 E. 50th St., NY, NY 10022; 800-733-3000.

Tweezers: Ultra sharp, extra long tweezer: Splintertweeze, $11, Tweezerman Corp., 55 Sea Cliff Ave., Glen000 Cove, NY 11542, 800-645-3340. Magnifying tweezer. Magnapoint, $5.20, Lab Safety Supply, Box 1368, Janesville, WI 53547-1368, 800 356-0783. Ergonomically designed 144348, Gingher stainless steel, 3½", $14, Clotilde Inc. Catalog, B3000, Louisiana, MO 63353-3000, 800 772-2891. Compact design: 146736 Sliver Gripper, $4.40; Clotilde Inc. Catalog.

Croquet Set: 8 architectural polyresin wickets, 2 stakes, 4 maple mallets and balls, $900, Brian Foster's Garden Architecture, 719 S. 17th St., Philadelphia, PA 19146; 215-545-5442; e-mail: BFgarden@aol.com

Apples: sample packs, $22 per dozen, Applesource, 1716 Apples Road, Chapin, IL 62628; 800-588-3854

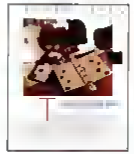


Key to photograph on page 23:
1) Pink Pearl, 2) Melrose, 3) Winter Banana, 4) Yates, 5) Kinset, 6) Kandil Sinap, 7) Jonagold, 8) Lady

Roses: Elizabeth Park, Asylum and Prospect Aves., Hartford, CT, 800-242-0017. Hours: dawn until dusk, 365 days a year; admission is free. New York Botanical Garden, Peggy Rockefeller Rose Garden, 200th St. and Southern Blvd., Bronx, NY; 718-817-8700, open 10-6, $3 for adults, $1 for seniors, students and children ages 6-16, free all day Wed. and 10-12 on Sat.

Street Trees: "Tree Reference Guide," $10, J. Schmidt & Sons Co., Box 189, Boring, OR 97009, www.jfschmidt.com/~jfs

BENCH GRINDERS
pp. 25-30



Grinders: Eight-inch industrial grade grinder: 19063, $145, Sears Craftsman Catalog, 2740 West 79th Street, Chicago, IL 60652, 800-377-7414. SuperGrind 2000: $398, Tormek USA, P.O. Box 1522, Blue Springs, MO 64013, 800-586-7635. Wet/dry grinder: 23-700, $206, and sharpening center 23-710, $220. Both from Delta International Machinery Corp, 246 Alpha Drive, Pittsburgh, PA 15238, 800-223-7278.

Wheel dresser: Desmond wheel dresser, 03A11, $15, Woodcraft, Wood County Industrial Park, Box 1686, Parkersburg, WV 26102-1686; 800-535-4482, 800-225-1153.

Buffing compounds: TC6: Tripoli, 3.5 oz, $2.25; E5, Emery, 3.5 oz, $2.50; SCR, Stainless, 3.5 oz, $3.50; PBC, Plastic, 3.5 oz, $2.8; JR1, Jeweler's rouge, 3.5 oz, $3.75; WR1, White rouge, 3.5 oz, $3.25, all by Dico Products Corp., 200 Seward Ave., Utica, NY 13503; 800-378-3546.

Wheels:

Six-inch cotton buffing wheel, No. 64939, $3.79, Sears Craftsman

Six-inch diamond wheel, No. ADT-B0517, $176, American Diamond Tool, Inc., 90 Arthur Street, Buffalo, NY 14207, 800-468-6800

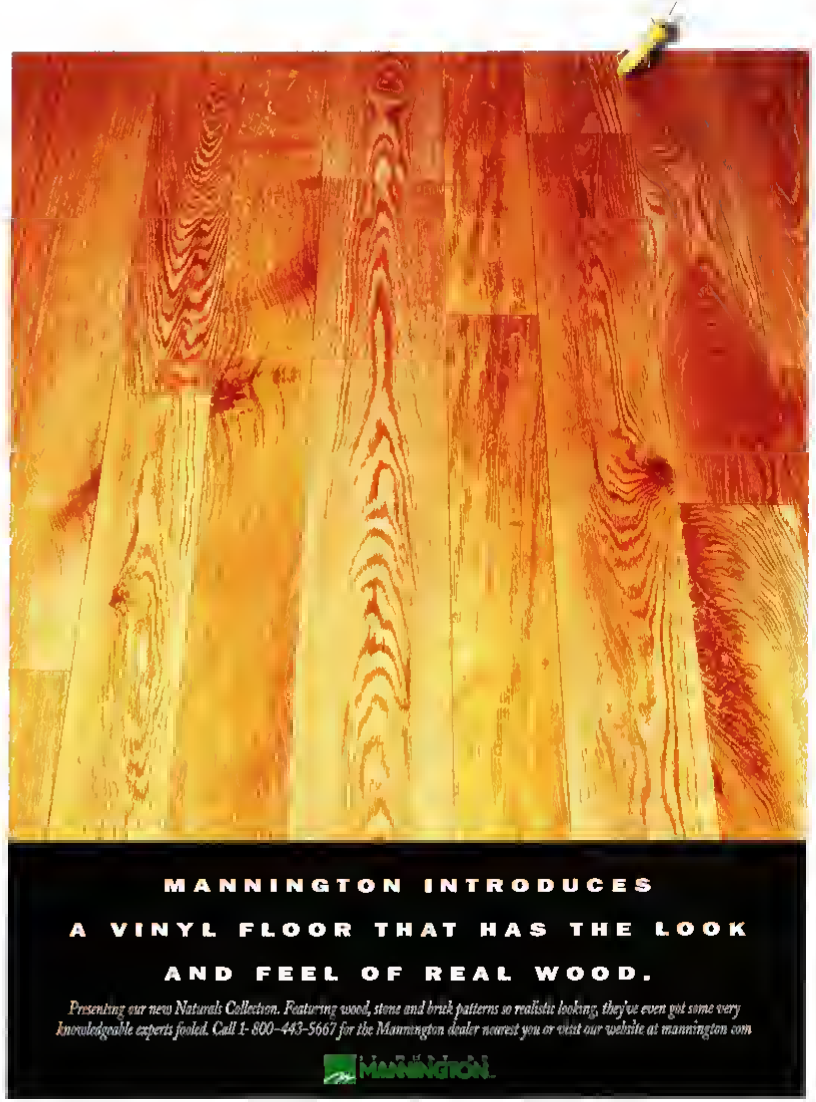
Eight-inch silicone carbide, No. 66253044770, $68, Norton Co., 1 New Bond St., Worcester, MA 01606, 800-446-1119

Six-inch muslin buffing wheel: No. 40, $8.60, Dico Products Corp.

Six-inch knotted wire wheel: No. 26156, $15.99, Sears Craftsman.

Six-inch Bear Tex (coarse) nylon wheel,

#★@%!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Six-inch solid felt buffing wheel No 02 70 05, $20, Highland Hardware, 1045 North Highland Ave NE, Atlanta, GA 30306, 800-241-6748
Six inch ceramic seeded gel wheel, 66253044102, $57, Norton Co
Nylox nylon bristle brush, $12, Dico Products Corp
Eight-inch white aluminum oxide wheel 66253044636, $25, Norton Co
Our thanks to Stanley Davenport, Urban Archeology, New York, NY Giovanni Diaz, WW Grainger, (Norton Co distributor), Elmsford, NY

BAY WINDOW
pp. 33-38

Prefab bay window Brosco No AB 184441 45 (divided light), made-to-order to fit rough opening 7' 5⅞" by 4' 5⅝", with 45-degree corners, $1,069, Brockway Smith, 146 Dascomb Rd , Andover, MA 01810, 508-475-7100
Our thanks to Michael Burns, Ipswich, MA Reneau de Beauchamp, The Current Past, 114 Forkner Dr , Decatur, Georgia, 30030-1609, 404-378-8451

PAINTBRUSHES
pp. 45-50

8115 pounder 3½" diameter, black bristle, $50, Symphony Art, 130 Beckwith Ave , Paterson, New Jersey 07503, 800-654-6279
8135 Ox hockey brush, 3", bristle/ox hair, $39.90, Symphony Art
8213 badger blender, 4" triple row, badger hair, $135 90, Symphony Art
Omega S-55-2, 2" large full oval brush setola (bleached) bristle, $40, imported from Italy by Fine Paints of Europe, PO Box 419, Woodstock, VT 05091, 800-332-1556
Omega S-203-4, 1" diameter round sash brush, setola (bleached) bristle, $22, Fine Paints of Europe
3660 sword striper, size 2, squirrel hair, $24 55, Symphony Art
Knickerbocker 1276, 70 percent bristle, 30 percent horsehair, discontinued, Bestt Liebco, 1201 Jackson Street, Philadelphia, PA 19148, 800-523-9095
8157 block stippler 3' x6", small tuft, $80 40, Symphony Art
120 Blackbird, 6", $48, Purdy Corporation, PO Box 83097, Portland, OR 97283, 800-547-0780
8100 flogger, 4", $23 60, Symphony Art
1777 Manhelp, discontinued, Bestt Liebco
8198 stencil 1⅜', $10 60, Symphony Art
Omega S-1011-3 large full oval brush, 3", $55, Fine Paints of Europe
Advantage sash brush, 2½", $18, Wooster Brush Co., 604 Madison Ave., Wooster, OH 44691, 800-392-7246
Cutaway brush Pippin, 3½" $27, Purdy
Further reading *Paint and Wallpaper*, by the Editors of Time Life Books, 1996, 128 pp , $17, Time-Life Books Inc , 1450 E Parham Road, Richmond, VA 23285, 800-621-7026
Our thanks to Michael and Patrick Chism, Chism Brothers Custom Painting, Inc., San Diego, CA Rick Trolinger, Colorama Paints and Supply, San Diego, CA Jeff Hines, painter, San Diego, CA Erin Laird, painter, San Diego, CA Gary Meinke, Bayside Paint Company, San Diego, CA Sherman L Weiss, president, Great American Marketing (Hi Tech brushes), Sun Valley, CA American Brush Manufacturing Association, Paint Applicator Division, Philadelphia, PA John Lahey, Fine Paints of Europe Harvey Baumgarten, Bestt Liebco Bob Ricksecker, Wooster Brush Co , Dave Howard, Purdy Corp , Ed Katten and Randy Cammerino, Symphony Art

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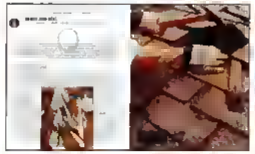
GENERATORS
pp. 53-56

Electrician: Allen Gallant, Gallant Electric, Waltham, MA, 617-893-4636
Portable Generators.
Honda EM3500, 3500 watts, $3,000, American Honda Motor Co Inc., Power Equipment Dir., 4475 River Green Parkway, Duluth GA 30136, 800-426-7701
PoweReach GN2560, 4 cycle, 2500 watts, $369, Campbell Hausfeld, 100 Production Drive, Harrison, OH 45030, 800-803-1436
Powermate 1000, 2 cycle, 1000 watts, $449, Coleman Powermate Inc., 49-70 Airport Road, Kearney, Nebraska 68848, 308-237-2181
Accessories.
Metal power inlet box, 6 circuits, $52.17, Gen/Tran Corp., Box 1231, Sterling, IL 61081, 888-436-8726
Manual transfer switch, 20216, $270, Gen/TranCorp.
Clamp meter No. 32, $149, Fluke Corp., Box 9090, Everett WA 98206-9090, 800-443-5853.
Our thanks to: Dan Dunn, Dunn's Equipment, Haverhill, MA. Peter Truss, Huntington Power Equipment, Shelton, CT. Joel Zink and Mistrella Egan, Sears Home Services.

FALL MAINTENANCE GUIDE

SEARCH AND SEAL
pp. 64-67



Roof patch: Wet Patch 20842, $6-$6.50 per gallon, Henry Co., 2911 Slauson Ave., Huntington Park, CA 90255, 213-583-5000. Wet/Dry Roof Cement, 037-GA, $6 per gallon, Gardner Asphalt, Box 5449, Tampa, FL, 33675-5449, 813-248-2101. Web site: www.gardnerasphalt.com
Polyurethane concrete crack sealant: 73-913-12-5, $4.99 per 10.2 oz tube, PL Adhesives and Sealants, Chemrex Inc., 889 Valley Park Drive, Shakopee, MN 55379, 800-433-9517.
Caulks for gutters: Gutter caulk 15248 (aluminum), 15263 (white), both $2.99 per 10.1 oz tube, Macklanburg-Duncan, 4041 North Santa Fe, Oklahoma City, OK 73118, 800-348-3571.
Caulk for flashing: 1011 Roof Proof-Super Flash, $3.50-$4 per 10 oz tube, Gibson-Homans, 1775 Enterprise Parkway, Twinsburg OH 44087, 800-433-7293.
Patching cement: SNF1 Squeeze-n-Fill, $7 per quart, Custom Building Products, 13001 Seal Beach Rd., CA 90740; 800-282-8786. Gutter leaf guards: $1.75, Amerimax (formerly "Alumax Home Products"), 450 Richardson Drive, Lancaster, PA 17603; 800-347-2586.
Gutter splash guard: Gusher Guard, $3.45, Amerimax. Gutter debris scoop Gutter Getter, $2.97, Working Products, Box 25813, Portland, OR 97298, 503-297-3668.
Our thanks to: Mac McCarter, Tekton Master Builders, Encinitas, CA.

HOUSE PAINT
pp. 66-71

For more information: Paint Quality Institute, information only through website. www.painrquality.com
Further reading: *Finishes for Exterior Wood: Selection, Application, and Maintenance*, by R. Sam Williams, Mark Knaebe, William Feist, 1996, 128pp., $19.95, Forest Products Society, 2801 Marshall Court, Madison, WI 53705, 608 231-1361 (ext. 209)
Our thanks to: Seth Knipe, Professional Painting Co., Hubbardston, MA.

CURING COMMON COLD
pp. 72-75

Weather-stripping: Sash weather strip Q-lon 5755-1401-0, Schlegel Corp., 1555 Jefferson Rd., P.O. Box 23197, Rochester, NY 14692-3197, 800 204-0863. V-strip flipperstrip WS85, $0.72 per 4-foot strip, Resource Conservation Technology, 2633 N. Calvert St., Baltimore, MD 21218, 410-366-1146. Self-stick pad with fin Fin Seal dust plug 1556-8623-2, Schlegel Corp. Door weather-stripping set. Frost King, WV21H, $15.98, Thermwell Products Co., 150 E. 7 St., Paterson, NJ 07524; 201 684-5000. Threshold sweep: double sweepseal WS25, $2.10/ft, aluminum channel: WS56, $4.95/3 feet, Resource Conservation Technology. Expandable foam caulk: MS1212 01 Great Stuff, $3.77 per 12-oz tube., Insta-Foam Products, 2050 N. Broadway, Joliet, IL, 800-800-3626. Cotton blow-in insulation: $10 per 25-lb bag (provides about 27 sq. ft of R-30 [10-inch depth] insulation value), Greenwood Cotton Insulation Products, 555 Sun Valley Drive, Roswell, GA 30076, 800-546-1332. Radiant barriers, Reflectix, $0.18 per sq./ft., Reflectix, Box 108, Markleville, Indiana 46056, 800-879-3645. Dennyfoil, $0.03 per square foot., Flameguard $0.07 per sq. ft, Denny Sales Corp., 3500 Gateway Dr., Pompano Beach, FL 33069, 800-327-6616. Insul-foil, $0.20 per square foot, Advanced Foil Systems, 820 S. Rockefeller Ave., Suite A,

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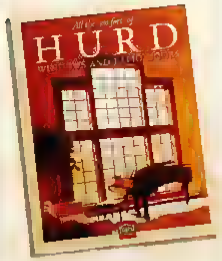

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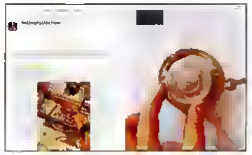
Our thanks to Royce Lewis, Little Rock Comfort Diagnostics and Solutions, Little Rock, AK. Frazer Dougherty, North Fork Retrofit, Greenport, NY, http://www.home-performance.org/achpa/achpa.htm

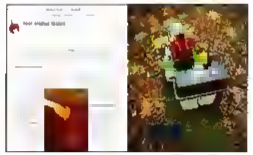
THERMOPERFECTION
pp. 76-78



Media filters: No. F35 media air cleaner, $250-$450 (installed), replacement filters, $30-$40, Honeywell Inc., Honeywell Plaza, Minneapolis, MN 55400-0524, 800-345-6770 ext. 731; http://www.honeywell.com. No. 2214, Media 1, $154, Lake Air, PO Box 4150, Racine WI 53404, 800-558-9436. Home-Free media filter, $520, Airguard Industries, PO Box 32578, Louisville, KY 40232, 502-969-2304. Electronic air cleaners: F50, whole house air cleaner, $550-$850 (installed), Honeywell Inc. LAD 2214 air cleaner, $510, Lake Air AIRA 2000CFM electronic air cleaner, $450-700, Carrier Residential Products Group, Box 46206, 70 West Morris St., Indianapolis, IN 46231; 800-422-7743.

Our thanks to Ted Weinberg, All Makes Heating and Air Conditioning Corp., 365 White Plains Road, Eastchester, NY 10709, 914-337-5555.

FOR THE LOVE OF LAWN/ THAT SPECIAL SEASON
pp. 80-83



Pruning saw: Felco folding saw, No. F60, $19.15, A.M. Leonard, 241 Fox Drive, PO Box 816, Piqua, OH 45356; 800-543-8955.

Further reading: *The Zone Garden* (3-book series for zones 3-4, 5, 6-7 and 8-9-10), by Charlotte M. Frieze, 1997, 224pp., $22.95, Fireside/Simon & Schuster, 1230 Ave. of the Americas, New York, NY 10020, 800-223-2348. *Beautiful Easy Lawns and Landscapes* by Laurence Sombke, 1994, 180pp., $16.95, The Globe Pequot Press, PO Box 833, Old Saybrook, CT 06475, 800-243-0495. *Southern Home Landscaping*, by Ken Smith, 1997, 192pp., $12.95, *Western Home Landscaping*, by Ken Smith, 1986, 192pp., $14.95, Penguin/Putnam, 200 Madison Ave., New York, NY 10016; 800-631-8571.

Our thanks to Dr. David Chalmers, Extension specialist, turf, Virginia Tech, Blacksburg, VA.

Dr. Bonnie Appleton, associate professor of horticulture, Virginia Tech, Virginia Beach, VA.

Tom Wichman, extension agent, urban horticulture, Orange County Cooperative and University of Florida Extension Service, Gainesville, FL.

Stephen Cockerham, superintendent of agricultural operations, University of California Riverside.

RAKES
pp. 84-85

Kid-size: Mini bamboo rake, $2.99, Ring's End, 181 West Ave., Darien, CT 06820; 800-390-1000.

Wide span: 42GS giant span metal rake, $40.59, extra teeth 42GST, pkg. of 29, $21.34, A.M. Leonard, PO Box 816, Piqua, OH 45356-0816; 800-543-8955.

Poly-Steel, EZF18 Union Ez-Flex poly-steel rake, $14.09, A.M. Leonard.

Thatch. PG407 rolling thatch rake, $39.95, Lee Valley Tools, Box 1780, Ogdensburg, NY 13669-0490, 800-871-8158.

T-handle: H503144 bedding rake, $28, Smith & Hawken, Two Arbor Lane, P.O. Box 6900, Florence, KY 41022-6900, 800-776-3336.

Flexible: HF16P multi-purpose clean-up rool, $27.04, A.M. Leonard.

Hand: H3532 Gardena hand rake, $14, Extension Handle, H491738, $14, Smith & Hawken.

Adjustable: F2725, $12, Smith & Hawken.

Grooming: 39WR wood lawn rake, $23.51, A.M. Leonard.

Push & Pull: PH101 power rake, $27.95, Lee Valley Tools.

Bamboo: 18BR Bamboo-2 yard rake, $8.90, A.M. Leonard.

NATURE ATTACKS
pp. 86

Fire suppressant sticks: Chimfex fireplace fire suppressant, $10 per stick, Standard Fusee Corp., Box 1047, Easton, MD 21601; 800-637-7802.

FAUCETS
pp. 88-91

Colonial with white porcelain handles, K161, satin nickel finish, $439.75, Phylrich International, 1000 N. Orange Dr., Los Angeles, CA 90038, 213-467-3143.

Original Fuller-style faucet set, MP0013C, chrome plated brass, $153.50, Mac the Antique Plumber, 6325 Elvas Avenue, Sacramento, CA 95819, 916 454 4507.

Étoile lavatory faucet, ETLS88, nickel finish, $1,031, Waterworks, 29 Park Avenue, Danbury, CT 06810, 800-899-6757.

Monticello, 4555-CP/97562, chrome/polished brass, $180; Moen Inc., 25300 Al Moen Dr., N. Olmstead, OH 44070-8022, 800-321-6636. www.moen.com.

Classic single-hole set, 850/018, UltraBrass finish113, $544, Jado Bathroom and Hardware Manufacturing Corp., Box 1329, Camarillo, CA 93011, 800-227-2734.

Roman-style widespread faucet, MP0090, polished brass, $340 (includes lift-and-turn drain), Mac the Antique Plumber.

Replica barber faucet with hand held spray, P0496, polished brass, $410, Mac the Antique Plumber.

Compression widespread valve cutaway, ¼ turn ceramic disk valve cutaway, Mac the Antique Plumber.

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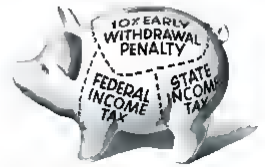

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Our thanks to Alan Lougee, Chicago Faucets, Des Plaines, IL. Bryan "Mac" McIntire, Mac the Antique Plumber, Sacramento, CA. Jonathan Paul, Paul Decorative Products, Bronx, NY. Allen Pfenninger, Moen Inc., N. Olmstead, OH.

FINANCES
pp. 93-94

Not One Dollar More! How to Save $3,000 to $30,000 Buying Your Next Home by Joseph Eamon Cummins, 1997 edition, $19.95, 231pp., Kells Media Group, Box 60, Oceanville, NJ 08231, 800-875-1995. *Get A Financial Life*, by Beth Kobliner, 1996 edition, 288pp., $12, Simon & Schuster,

1230 Avenue of the Americas, New York, NY 10020, 800-223-2348
Our thanks to: Paul Haveman, HSH Associates, Butler, NJ; Donald T. Kukla, Monetta Group, St. Louis, MO

MILTON DREAM HOUSE
pp. 108-115

Further reading: "Inspecting Your Home," No. A1.1, by Building Research Council, University of Illinois, 1993, 8pp., $2 plus $1.50 shipping/handling. Make checks payable to University of Illinois and mail to School of Architecture Building Research Council, College of Fine and Applied Arts, University of Illinois at Urbana-Champaign, 1 East St. Mary's Road, Champaign, IL 61820, 800-336-0616
Our thanks to: Allen Gallant, Gallant Electric, Waltham, MA; Fred W. Bucklin, F.W. Bucklin Appraisal Co., Walpole, MA; Tom Wirth, Thomas Wirth Associates, Inc., Sherborne, MA; Donald Robbins, building commissioner, Milton, MA.

HERITAGE SEEDS
pp. 118-121

Seed Savers Exchange, 3076 N. Winn Rd., Decorah, Iowa 52101. Annual membership $25. Free brochure, 319-382-5990. Native Seeds/SEARCH, 2509 N. Campbell Ave. #325, Tucson, AZ 85719. Preserves traditional native crops and seeds of the southwest United States and northern Mexico. Chiles, corn, beans, squash, etc. Catalog $1, Web site www.desert.net/seeds/
Other seed sources: Seeds Blum, catalog $3, HC33, Idaho City Stage, Boise, ID 83706, 208-342-0858. Tomato Growers Supply Co., Box 2237, Fort Myers, FL 33902, 941-768-1119. Seeds of nearly 100 heirloom tomatoes. Heirloom Seedling Nursery, Box 4235, Santa Barbara, CA 93140, 805-968-5444, fax 805-562-1248. Web site: www.heirloom.com/heirloom/. Johnny's Selected Seeds, free catalog, Foss Hill Road, Albion, ME 04910, 207-437-9294
Further reading: *Seed to Seed* by Suzanne Ashworth, 1991, 222pp., $20, available through Seed Savers

BARN AGAIN
pp. 122-127

Barn relocater: Ken Epworth, The Barn People, Box 4, Morgan Hill, South Woodstock, VT 05071-0004, 802-457-3356
Barn/house builder: Tom Woodard, Woodard & Greenstein Barn Homes, 506 East 74th Street, 5th fl., New York, NY 10021, 212-988-2906 or 800-332-7847.
Further reading: *Old Barns in the New World: Reconstruction History*, by Richard W. Babcock and Lauren R. Stevens, 1996, 192pp., $16.95, Berkshire House Publishers Inc., 480 Pleasant Street, Lee, MA 01238, 800-321-8526. *The Essential Book of Barns*, by Davis Larkin, 1995, $17.95, Universe Publishing, 300 Park Ave. S., New York, NY 10160, 800-522-6657. *The American Barn*, by Randy Leffingwell, 1997, 192 pp., $29.95, Motorbooks International, 729 Prospect Avenue, PO Box 1, Osceola, WI 54020, 800-458-0454. *Mr. Bristol's Barn*, by John Szarkowski, 1997, $16.95, Harry N. Abrams Inc., 100 Fifth Ave., New York, NY 10011, 800-288-2131

AMERICAN CRAFTSMAN
pp. 128-135

Fireplace makers: Jeff Gammelin, Freshwater Stone & Brick Inc., U.S. Route 1, Orland, Maine 04472; 207-469-6331. Our thanks to: Michael Hewes & Co., Blue Hill, Maine

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GARAGES
pp. 136-141

Minnegasco study: "Report on Undiagnosed Carbon Monoxide Complaints," $20, and video about the study, "The Garage to House Connection," $25. Write to: Jan Pieri, Minnegasco, 800 LaSalle Ave., Minneapolis, MN 55402, 612-321-4309.

Carbon monoxide detectors: Monoxor II with breath analysis module, $795, Bacharach Inc., 625 Alpha Drive, Pittsburgh, PA 15238-2878, 412-963-2157. Nightshawk: No. 900-0076, $55, Kidde Safety Products, 1394 South Third Street, Mebane, NC 27302, 800-880-6788.

Equipment installed

Exhaust fan for water heater: No. 5C083 Tjernlund VP-2 vent kit, $267, and Fantech No. 3TJ95 8-inch remote bathroom exhaust fan (garage) $331; W.W. Grainger Co., 5845 Grand Ave., Maspeth, NY 11378, 212-629-5660.

Installation:

Stephen Klossner: Advanced Certified Thermography, 145 St. Croix Trail South, Lakeland Shores, MN 55043, (612) 436-5120.

Tom Greiner: 200C Davidson Hall, Iowa State University, Ames, IA 50011-3080, 515-294-6360.

Neighbors Heating & Cooling, 2700 Graham, Ames, IA 50010, 515-232-7777.

Plastic storage sheds ($99-$349) for outdoor chemical storage: Rubbermaid Inc. Consumer Service, 1147 Akron Road, Wooster, OH 44691-6000, 800-643-3490 (for distributors).

For more information: Web sites on carbon monoxide: Q & A by the University of Minnesota Extension Service: www.mes.umn.edu/Documents/H/K/HK1000.html and "Carbon Monoxide Headquarters": www.phypc.med.wayne.edu.

Further reading: "The Senseless Killer" brochure (CPSC 464), free, write to Consumer Product Safety Commission, Washington, DC 20207. "Preventing Carbon Monoxide Poisoning from Small Gasoline-Powered Engines and Tools," (96-118), The National Institute for Occupational Safety and Health (NIOSH), 4676 Columbia Parkway, MS C13, Cincinnati, OH 45226, 800-356-4674.

JACK LONDON
pp. 142-147

Jack London State Historic Park, 2400 London Ranch Road, Glen Ellen, CA 95442, 707-938-5216. Park hours: 9:30 am to 7 pm in summer, 9:30 am to 5 pm in winter. Closed Thanksgiving, Christmas and New Year's days. Admission: $6 per vehicle. House of Happy Walls Museum: 10 am to 5 pm, year round.

For more information, Jack London Bookstore and Research Center, 14300 Arnold Dr., Glen Ellen, CA 95442; 707-996-2888.

Further Reading: *A Pictorial Biography of Jack London*, by Russ Kingman, 1979, 255pp., $19.95, Jack London Bookstore and Research Center.

Our thanks to Glenn E. Burch, state historian, California Department of Parks and Recreation, Silverado District, Sonoma, CA. The staff of the Jack London State Historic Park, Winnie Kingman, Glen Ellen, CA.

Further reading: Jack London's writings are available in many editions, including *The Portable Jack London* 1994, 672pp., $14.95, Penguin USA, 375 Hudson Street., New York, NY 10014, 800-253-6476, *Collected Works of Jack London*, 1991, $24.95, Marlboro Books, available from the Jack London Bookstore. London's most famous books such as *Call of the Wild* and *White Fang* as well as his best-known short stories such as "To Build a Fire" are widely available at bookstores and public libraries in the United States.

POSTER
pp. 149

Further reading: *Dictionary of Architecture and Construction, 2nd Edition*, edited by Cyril M. Harris, 1993, 924pp., $65, The McGraw-Hill Companies, 11 West 19th Street, New York 10011; 800-722-4726. *Old House Dictionary*, by Steven J. Phillips, 1994, 237pp. $12.95, Preservation Press, John Wiley & Sons, 605 Third Ave., Suite 367, New York, New York 10158, 800-225-5945. *Identifying American Architecture*, by

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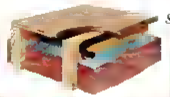
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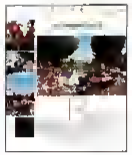
John J. G. Blumenson, 1981, 120pp., $12.95, AltaMira Press, 1630 North Main St., Suite 367, Walnut Creek, California 94596, 925-499-9774

The Visual Dictionary of American Domestic Architecture, by Rachel Carly, 1994, 272pp., $40 (hardcover), $19.95 (softcover), Henry Holt & Company, 115 W. 18 St., New York, NY 10011, 800-488-5233

Dictionary of Building Preservation, edited by Ward Bucher, 1996, 560pp., $39.95 (softcover), Preservation Press, John Wiley & Sons

GARDEN RAILROADS
pp. 151



Landscape designer: Ralph Williams Landscape Design, Post Office Box 435, Mendon, Massachusetts 01756, 508-478-5601. Fax: 508-473-0163

Landscape installer: Eric Peterson Landscaping & Construction, Post Office Box 435, Mendon, Massachusetts 01756, 508-478-1957

Railroad starter kit: electric locomotive, 2 cars, transformer, 4-foot diameter circle of track, $280; Trains & Trees. Weston Nurseries, Hopkinton, Massachusetts, 508 497-2550

Sandy River electric models: LGB Forney locomotive, passenger car, flat car, caboose, $600; Trains & Trees

Custom-made Old Sturbridge Village house, $300; George Konrad, 27 Hall Ave., Henniker, NH 03242, 603-428-3712

Live steam scale model locomotive number 24, Sandy River & Rangeley Lakes Railroad, Roundhouse Engineering, Doncaster, England, fax: 011-44-130-276-1312, or through Trains & Trees

Boothbay Railway Village: Route 27, Post Office Box 123, Boothbay, Maine 04537, 207 633 4727. The attraction is open seven days a week mid-June through mid-Oct., Adults $6, children $3

DIRECTORY

Further reading:

Walt Disney's Railroad Story by Michael Broggie, 1997, 430 pp, $59.95, Pentrex, Box 94911, Pasadena, CA 91109, 800-950-9333.

Steam in the Garden, subscription $27 per year (6 issues), Box 335, Newark Valley, NY 13811, 607-642-8119

Garden Railways, subscription $21 per year (6 issues), Kalmbach Publishing Co., 21027 Crossroads Circle, PO Box 1612, Waukesha, WI 53187, 800-533-6644

Live Steam, subscription $35 per year (6 issues), $64 for 2 years, Village Press Inc., 2779 Aero Park Drive, Box 629, Traverse City, MI 49686, 800-447-7367

Sandy River and Rangeley Lakes Railroad by L. Peter Cornwall and Jack W. Farrell, 1973 (out of print), Pacific Coast Mail, Edmonds, WA

For more information:

LGB (Lehmann) model trains and general information: www.lgb.com/lgb_gastshtml

Directory of worldwide rail sites, model railroad manufacturers, video, audio, software and electronics for the garden railroad: www.rrhistorical.com/nmra/retail.html (National Model Railroad Association site)

Boothbay Railway Village home page, antique vehicles, steam trains, historic photos, latest projects, membership: lincoln.midcoast.com/~railvill

Steam in the Garden home page, articles, events, news, photos, videos, on-line garden railway museum, catalogs, subscriptions: www.steamup.com

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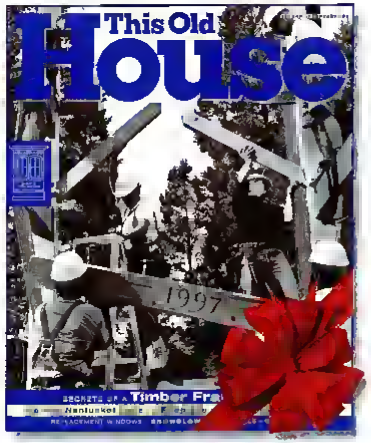

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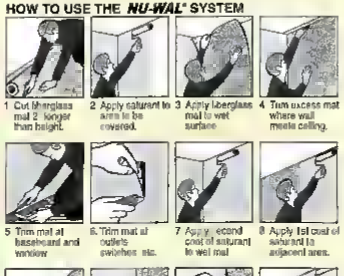
1 Cut fiberglass mat 2" longer than height.
2 Apply saturant to arm to be covered.
3 Apply fiberglass mat to wet surface.
4 Trim excess mat where wall meets ceiling.
5 Trim mat at baseboard and window.
6. Trim mat at outlets, switches, etc.
7 Apply second coat of saturant to wet mat.
8 Apply 1st coat of saturant to adjacent area.
9 Apply mat to 2nd area, overlapping by 1".
10.Cut down center of overlap (both layers).
11 Remove mat strips on both sides of cut.
12.Apply 2nd coat of saturant (include seam).

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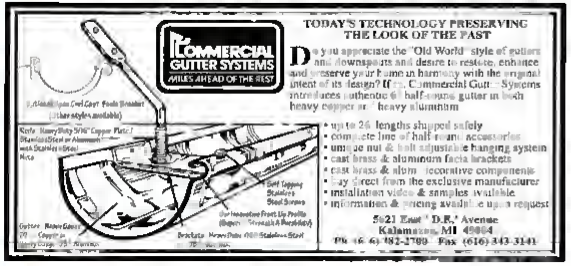

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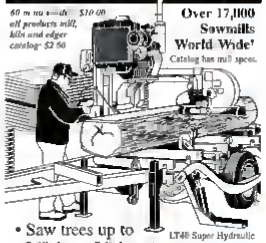

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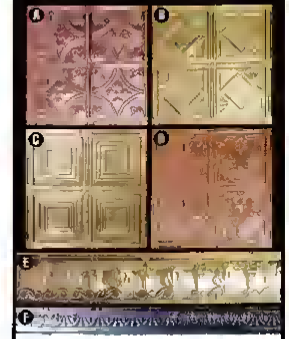

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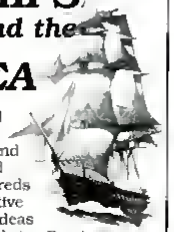

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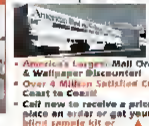

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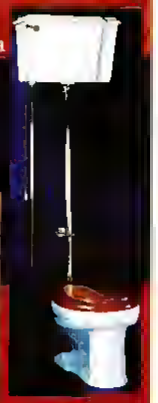

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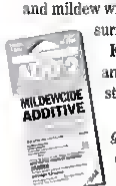

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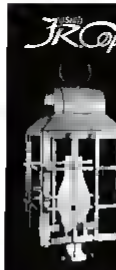

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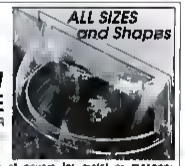

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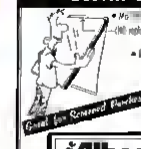

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CONTACT

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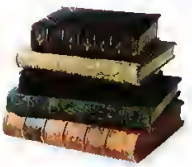

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